

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

**CONFIDENTIAL--TO BE FILED UNDER SEAL
SUBJECT TO PROTECTIVE ORDER**

**IN RE: CATHODE RAY TUBE (CRT)
ANTITRUST LITIGATION**

Case No. 07-CV-5944-JST

MDL No. 1917

THIS DOCUMENT RELATED TO:

ALL DIRECT PURCHASER ACTIONS

EXPERT REPORT OF PHILLIP M. JOHNSON, PH.D.

May 26, 2023

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I. Introduction, Assignment, and Summary of Conclusions

1. I am the same Phillip Johnson who previously provided two reports in this matter, dated November 19, 2021¹ (“Johnson Class Certification Report” or “my Class Certification Report”) and March 4, 2022² (“Johnson Class Certification Reply Report” or “my Class Certification Reply Report”). I maintain the opinions and analyses expressed in those reports.
2. A summary of my training, experience, and prior testimony, updated since my last report, is shown in **Exhibit 1**. Econ One is being compensated for the time I spend on this matter at my normal and customary rate of \$650 per hour. Econ One is also being compensated for time spent by research staff on this project at their normal and customary hourly rates ranging from \$195 to \$415 per hour. Econ One’s compensation in this matter is not tied to the outcome of the litigation.
3. Plaintiffs are a Class of direct purchasers of cathode ray tube (“CRT”) products from the alleged conspirators, including Defendants Irico Group Corporation and Irico Display Devices (together “Irico Defendants” or “Irico”). Plaintiffs allege that Irico Defendants and their co-conspirators³ engaged in a price-fixing conspiracy for the purpose of fixing, raising, maintaining and/or stabilizing prices of CRTs and that CRT products (CRTs and finished products incorporating CRTs) were sold at elevated prices in the United States between March 1, 1995 and November 25, 2007 (the “Class Period”).
4. I understand the following Class has been certified by the court (“Class” and “Class Members”):

¹ Expert Report of Phillip M. Johnson, Ph.D., November 19, 2021 (“Johnson Class Certification Report” or “my Class Certification Report”).

² Reply Expert Report of Phillip M. Johnson, Ph.D., March 4, 2022 (“Johnson Class Certification Reply Report,” or “my Class Certification Reply Report”).

³ Defendants and co-conspirators are listed in my Class Certification Reports. Johnson Class Certification Report, fn. 1.

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All persons and entities who, between March 1, 1995 and November 25, 2007, directly purchased a CRT Product⁴ in the United States from any Defendant or any subsidiary or affiliate thereof, or any co-conspirator or any subsidiary or affiliate thereof. Excluded from the class are defendants, their parent companies, subsidiaries and affiliates, any co-conspirators, all governmental entities, and any judges or justices assigned to hear any aspect of this action.⁵

5. I have been asked by counsel for Direct Purchaser Plaintiffs (“DPPs”):
 - a. Whether economic evidence is consistent with the alleged collusion by the Irico Defendants and the alleged co-conspirators in the global CRT industry;
 - b. Whether the alleged collusion harmed Class Members by elevating CRT prices; and
 - c. To calculate the overcharge damages incurred by the Class as a result of the alleged collusion.
6. In the course of my work, I and my staff have reviewed data, documents, and testimony developed through the course of discovery in this case. A list of materials that I relied upon in preparing this report (in addition to those materials listed in my two previous reports) is given in **Exhibit 2**. I understand that discovery is ongoing. I reserve the right to consider any additional evidence and supplement my analysis and opinions.
7. Based on my review of documents and data and my analysis of those materials, I have concluded the following:
 - a. Economic evidence in this case is consistent with effective collusion by the Defendants and alleged co-conspirators.

⁴ I understand CRT products include CRTs, CRT TVs, and CRT monitors.

⁵ In Re: Cathode Ray Tube (CRT) Antitrust Litigation, Order Granting Motion for Class Certification, August 1, 2022 (“Class Certification Order”), 1.

- i. The structure of the CRT industry facilitated collusion. This includes high barriers to entry, a concentrated market dominated by the alleged conspirators, multi-market contact of the alleged conspirators, collusion by alleged conspirators in other industries, a high degree of product standardization and substitutability, and relationships among alleged conspirators. (See Section II.B.1.)
- ii. The alleged conspirators' documented activities are consistent with effective collusion. These activities included regular meetings with explicit coordination on prices and output, explicit coordination on market shares and customers, exchanges of competitively sensitive information, and monitoring and enforcement of the collusion to deter cheating. (See Sections II.B.2-3)
- b. Class Members' prices were elevated by the alleged collusion. (See Section III.A.)
- c. To quantify the elevation of CRT prices due to the alleged collusion, I estimated a regression model, using the widely accepted before-and-after methodology. From that analysis, I find that, during the Class Period, CDT prices were, on average, elevated by 10.7 percent and CPT prices were elevated by 6.1 percent. (See Section III.B.)
- d. Economic evidence is consistent with Irico having participated in the alleged collusion. (See Section IV.)
- e. Overcharges incurred by the Class due to the alleged collusion, were \$1.085 billion. (See Section V.)
 - i. Overcharges incurred by the Class on CRTs were \$346 million.
 - ii. Overcharges incurred by the Class on CRT Finished Products were \$739 million.

II. Collusion and the Effects of the Alleged Collusion in the CRT Industry

8. When firms collude,⁶ their goal is generally to elevate their profits above what would otherwise have resulted from their competition. For collusion to be effective, 1) the collusion must be feasible and compatible with the profit interests of the participants, and 2) the actions taken by participants must be sufficient to effectuate and maintain collusive behavior. I find that these conditions have been satisfied for the alleged conspirators in this case.
9. First, the structure of the industry and the incentives of the alleged conspirators facilitated collusion and were consistent with collusion being effective. Below, I describe several main features of the CRT industry which facilitated effective collusion. These include: 1) high entry barriers; 2) high market concentration, controlled by the alleged conspirators; 3) multi-market contacts of the alleged conspirators; 4) standardized products; and 5) cross-ownership, joint ventures, and technology transfers among the alleged conspirators.
10. Second, the documented activities of the firms were sufficient to effectuate and maintain the agreement, and for it to have its desired effect in suppressing competition and elevating CRT prices. Over the course of several years, the alleged conspirators engaged in extensive communications which included, among other things, 1) establishing minimum price targets for CRTs, 2) agreements to restrain CRT output and capacity; and 3) exchanges of information on pricing, capacity, and production.⁷

A. The Economics of Collusion

11. The basic economic consequences of collusion by sellers are well understood. Reduced competition enables firms to profitably raise prices in the market above competitive levels without losing so many sales as to make the price increase

⁶ Economists use the term “collusion” to refer to coordination by firms to moderate their competition (e.g., price competition). See, e.g., Massimo Motta, *Competition Policy: Theory and Practice* (Cambridge University Press, 2004), p. 141.

⁷ Johnson Class Certification Report, 17-32,

unprofitable. Thus, collusion results in higher prices, increased purchasers' costs, and elevated profits for the colluding firms.

12. There is an extensive literature in economics analyzing cartels and collusion.⁸ Firms may enter cartels (e.g., price-fixing; bid rigging) to raise prices, slow price declines, or control market uncertainties, but ultimately the goal is to obtain greater profit than they otherwise would have. The gains from collusion come despite each firm's temptation to cheat on the arrangement to obtain short-term gains, because successful cooperation over time can be far more profitable and the firms may adopt punishment or retaliation strategies to make cheating costly.
13. Economics literature has identified conditions which facilitate collusion and under which a collusive strategy is likely to succeed. Successful collusion is generally aided by several general conditions. First, the circumstances of the industry must be sufficiently conducive to collusion to make success feasible. Second, the firms must perceive collusion as profitable—that is, successful collusion must be capable of elevating the profits of the colluding firms above the levels they would otherwise obtain.⁹ Third, the firms must identify the terms of their cooperation and agree to them.¹⁰ Fourth, the firms must be able to implement and maintain compliance with the collusion.¹¹ Communications are important in facilitating express collusion,¹² as it is a key element in the third and fourth elements of successful collusion. As I describe below, market conditions and actions taken by the alleged conspirators are consistent with the alleged collusion being effective.

⁸ See, e.g., Massimo Motta, *Competition Policy: Theory and Practice* (Cambridge University Press, 2004).

⁹ See, e.g., George J. Stigler, "A Theory of Oligopoly," *Journal of Political Economy* 72 (1964): p. 46; Massimo Motta, *Competition Policy: Theory and Practice* (Cambridge University Press, 2004), p. 142.

¹⁰ See, e.g., Massimo Motta, *Competition Policy: Theory and Practice* (Cambridge University Press, 2004), p. 141.

¹¹ See, e.g., Massimo Motta, *Competition Policy: Theory and Practice* (Cambridge University Press, 2004), p.142 and Roger Blair and Jeffrey Harrison, *Monopsony in Law and Economics* (Princeton University Press, 2010), p. 51.

¹² Collusion can be either express or tacit. Tacit collusion refers to independent conduct in accordance with an unspoken understanding, i.e., unaccompanied by communications among the parties. See, e.g., Massimo Motta, *Competition Policy: Theory and Practice* (Cambridge University Press, 2004), p.141. There is no question about the relevant alleged collusion in this case being explicit, so I discuss collusion here without reference to issues relating only to tacit collusion.

B. Economic Evidence is Consistent with Effective Collusion in the CRT Industry

1. *The Structure of the CRT Industry Facilitated the Effective Collusion*

14. Economic evidence in this case is consistent with the global CRT industry having been conducive to effective collusion. In my Class Certification Report, I discussed the significance of various economic factors related to CRT industry and the alleged conspiracy and discussed the economic implications of the extensive evidentiary record of collusive activities. I review and expand on that discussion here.

1) Substantial Barriers to Entry

15. In my Class Certification Report, I described substantial barriers to entry that existed in the CRT industry¹³ and explained that “[e]conomists recognize entry barriers as a factor that promotes successful maintenance of a conspiracy.”¹⁴

2) A Concentrated Market, Dominated by the Alleged Conspirators

16. Economists also recognize that a high degree of market control by cartel members is associated with their ability to successfully maintain the cartel.¹⁵ As I stated in my Class Certification Report, the alleged conspirators’ “high degree of control [over sales] simplifies their coordination because there is little by way of an outside competitive presence to exert pressure on the alleged conspiracy’s coordination efforts.”¹⁶ I showed that the alleged conspirators maintained control of over 80 percent of global CPT sales and 90 percent of global CDT sales.¹⁷ The top four

¹³ Johnson Class Certification Report, par. 68-71.

¹⁴ Johnson Class Certification Report, par. 68-71. See also, Massimo Motta, *Competition Policy: Theory and Practice*, (Cambridge: Cambridge University Press), 2004, 143-144 (“The easier entry into an industry (the lower entry barriers) the more difficult to sustain collusive prices [...] therefore, one should expect that the lower entry barriers (as determined by fixed entry costs that new firms would have to sink into the industry) the more difficult it will be to sustain collusion.”

¹⁵ See, e.g., Massimo Motta, *Competition Policy: Theory and Practice* (Cambridge University Press, 2004), p. 142-143.

¹⁶ Johnson Class Certification Report, par. 23.

¹⁷ Johnson Class Certification Report, par. 22, Figure 4.

alleged conspirators alone controlled at least 66 percent of global CDT sales and 60 of global CPT sales in a given year.

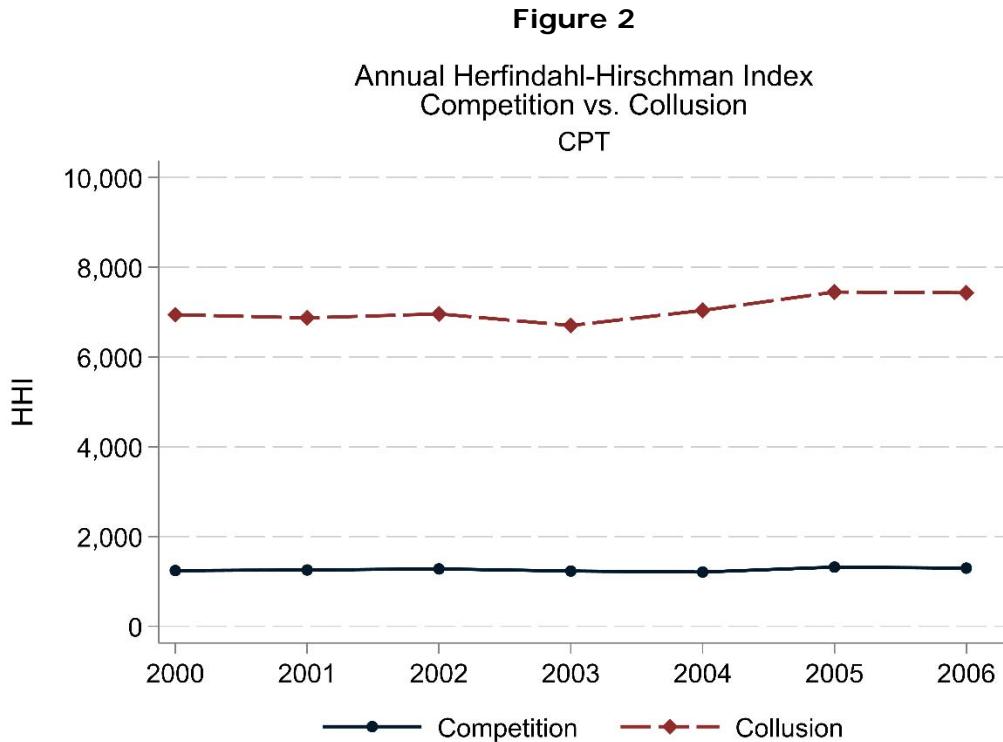
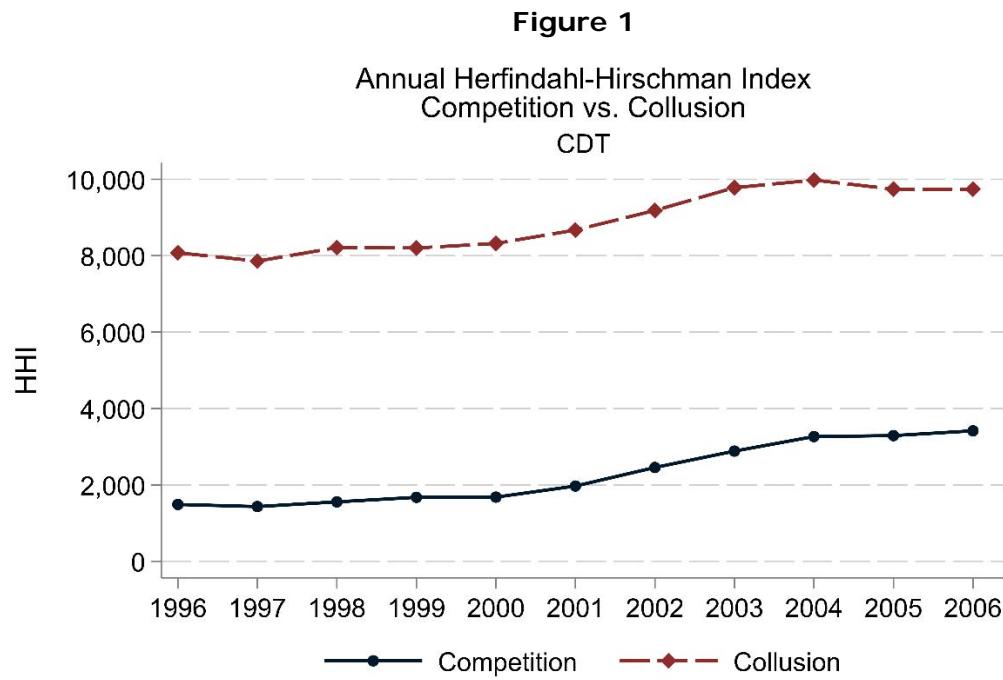
17. To the extent that collusion enabled alleged conspirators to coordinate their activities, the alleged collusion would have increased effective concentration, and reduced competition in the global CRT industry. Treating the alleged conspirators as a cartel for CDT, a commonly accepted measure of market concentration (the Herfindahl-Hirschman Index or HHI)¹⁸ would have ranged from 7,859 to 9,980 (calculated by treating the alleged conspirators as a single firm). Calculating this concentration measure under the assumption that the firms were actually competing, it would have ranged from 1,432 to 3,415. Similarly, the cartel HHI for CPT during the alleged collusion ranged from 6,703 to 7,448, while the competitive HHI would have ranged from 1,208 to 1,318. See Figure 1 and Figure 2. A market with an HHI of 2,500 or greater is considered highly concentrated while a market with an HHI of 1,500 to 2,500 is moderately concentrated.¹⁹

¹⁸ U.S. Department of Justice, “Herfindahl–Hirschman Index,” <https://www.justice.gov/atr/herfindahl-hirschman-index>. (“The HHI is calculated by squaring the market share of each firm and then summing the resulting numbers”).

¹⁹ U.S. Department of Justice, “Herfindahl–Hirschman Index,” <https://www.justice.gov/atr/herfindahl-hirschman-index>.

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3) Alleged Conspirators with Contact in Multiple Markets

18. Economists have recognized that when firms interact in multiple markets, it can facilitate their efforts to sustain collusion. This is, in part, because deviations from collusive agreements in one market may be punished in both markets, thus, incentives to cheat are damped.²⁰
19. In addition to the CRT market, most of the alleged conspirators participated in the closely related TFT-LCD market. Moreover, some of the alleged conspirators (Chunghwa, LG, Philips, Samsung, Hitachi, and Toshiba) also allegedly organized a cartel in the TFT-LCD market.²¹ As I described in my Class Certification Report, the parallel conspiracy in the TFT-LCD market would have facilitated the maintenance of higher collusive CRT prices.²² In addition to increasing the ability to deter cheating, this would have made it easier to coordinate across markets and have provided additional opportunities to exchange CRT price and capacity information.
20. Some of the alleged conspirators were also allegedly involved in collusion in additional markets, including: DRAM,²³ optical disk drives,²⁴ smart card chips,²⁵

²⁰ See, e.g., Luis M. B. Cabral, *Introduction to Industrial Organization*, Massachusetts Institute of Technology, 2000, pp. 138 - 139. ("Theoretical analysis and empirical evidence suggest that firms that compete with each other in several markets have a greater propensity to collude, and/or collude to a greater extent.")

²¹ Johnson Class Certification Report, par. 21. Details of the alleged conspirators' participation in the TFT-LCD cartel are available in European Commission Decision in LCD, December 8, 2010, Section 4.1-4.2. https://ec.europa.eu/competition/antitrust/cases/dec_docs/39309/39309_3643_4.pdf. Hitachi Displays pled guilty to fixing prices for TFT-LCDs. U.S. Department of Justice, Hitachi's Plea Agreement, May 22, 2009, <https://www.justice.gov/atr/case-document/plea-agreement-163>. Toshiba was found guilty of fixing LCD prices and was fined \$87 million in a jury verdict. CRN, "Toshiba Found Guilty Of LCD Price-Fixing," <https://www.crn.com/news/components-peripherals/240003216/toshiba-found-guilty-of-lcd-price-fixing.htm>.

²² Johnson Class Certification Report, par. 21.

²³ Hitachi, Mitsubishi, Samsung, and Toshiba were implicated by the EC for their participation in the DRAM cartel. European Commission Decision in DRAM, May 19, 2010, <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52011XC0621%2803%29&from=EN>.

²⁴ Hitachi-LG Data Storage, Inc., a joint venture of Hitachi, Ltd. and LG Electronics, Inc., pled guilty to fixing prices of optical disk drives. U.S. Department of Justice, Hitachi-LG's Plea Agreement, November 8, 2011, <https://www.justice.gov/atr/case-document/plea-agreement-164>.

²⁵ Philips, Samsung, and Renesas (at the time a joint venture of Hitachi and Mitsubishi) were found to have

lithium-ion batteries,²⁶ gas-insulated switchgear,²⁷ and automotive parts.²⁸ Hitachi, LG/Philips/LPD, Mitsubishi, Panasonic, Samsung, and Toshiba have pled guilty to charges of price fixing in the United States and/or were implicated by the European Commission in these cartels.

4) A High Degree of Standardization and Substitutability

21. CRT products were standardized and subject to a high degree of demand and supply substitutability.²⁹ CRTs were primarily differentiated according to their application (CDT or CPT) and size, and other ancillary features, such as aspect ratio, flatness,

coordinated their market behavior for smart card chips in breach of EU rules that prohibit cartels. The European Commission Press Release, “Antitrust: Commission fines smart card chips producers € 138 million for cartel,” September 3, 2014, https://ec.europa.eu/competition/presscorner/api/files/document/print/en/ip_14_960/IP_14_960_EN.pdf.

²⁶ LG Chem, Ltd. and Panasonic Corp. (and its subsidiary Sanyo) pled guilty to fixing prices of cylindrical lithium-ion battery cells. U.S. Department of Justice, “Panasonic and Its Subsidiary Sanyo Agree to Plead Guilty in Separate Price-Fixing Conspiracies Involving Automotive Parts and Battery Cells,” July 18, 2013, <https://www.justice.gov/opa/pr/panasonic-and-its-subsidiary-sanyo-agree-plead-guilty-separate-price-fixing-conspiracies>. Samsung SDI and Panasonic also admitted to the EC their involvement in the LIB cartel. The European Commission Press Release, “Antitrust: Commission fines rechargeable battery producers €166 million in cartel settlement,” December 12, 2016, https://ec.europa.eu/competition/presscorner/detail/en/IP_16_4356.

²⁷ Hitachi, Mitsubishi, and Toshiba were implicated by the EC for their participation in the cartel. European Commission Decision in gas insulated switchgear, January 24, 2007, <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52008XC0110%2801%29&from=EN>.

²⁸ Hitachi Automotive Systems, Ltd. pled guilty to fixing prices of shock absorbers, starters, alternators, and other electrical automotive components. U.S. Department of Justice, “Hitachi Automotive Systems Agrees to Plead Guilty to Involvement in Anti-Competitive Auto Parts Conspiracy,” August 9, 2016, <https://www.justice.gov/opa/pr/hitachi-automotive-systems-agrees-plead-guilty-involvement-anti-competitive-auto-parts>. Panasonic Corp. pled guilty to fixing prices of a number of automotive parts. U.S. Department of Justice, “Panasonic and Its Subsidiary Sanyo Agree to Plead Guilty in Separate Price-Fixing Conspiracies Involving Automotive Parts and Battery Cells,” July 18, 2013, <https://www.justice.gov/opa/pr/panasonic-and-its-subsidiary-sanyo-agree-plead-guilty-separate-price-fixing-conspiracies>. Mitsubishi, Hitachi Ltd., and Hitachi Automotive Systems were implicated by the EC for their participation in the cartel. European Commission Decision in Alternators and Starters, January 27, 2016, <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52016XC0419%2801%29&from=EN>.

²⁹ Johnson Class Certification Report, par. 26-29; 58-61; Johnson Class Certification Reply Report, par. 35-42.

and dot pitch. These features were highly standardized through industry standards.³⁰ As I described in a previous report, “[t]his created a structured pricing environment in which buyers and sellers started with base configurations and then incorporated add-ons associated with a particular customer need.”³¹

22. The standardized nature of the products, with a few principal features, allowed the alleged conspirators to agree on price and outputs based on a small number of base CRT configurations – often only referring to CRTs by application and size.³² The alleged conspirators set target prices for base configurations with price differentials for additional product features.³³

5) Relationships Among Alleged Conspirators

23. Economists have recognized that relationships among competitors such as joint ventures or other technology sharing agreements are a facilitating factor for effective collusion.³⁴ When firms have such cooperative relationships, it facilitates their cooperation, e.g., through opportunities for coordination and monitoring, and enhances their ability to sustain effective collusion.
24. Several of the alleged conspirators in the CRT industry were engaged in joint ventures. For example, conspirators Toshiba and Panasonic formed MTPD as a joint venture in 2003³⁵ and LGE partnered with Philips to create LG Philips Display (LPD) in 2001, which encompassed both founders’ CRT production and sales

³⁰ Johnson Class Certification Report, par. 58.

³¹ Johnson Class Certification Report, par. 60.

³² See, e.g., Department of Justice Antitrust Division, “Price Fixing, Bid Rigging, and Market Allocation Schemes: What They Are and What to Look For,” *An Antitrust Primer*, September 2005 (revised February 2021). (“The more standardized a product is, the easier it is for competing firms to reach agreement on a common price structure.”)

³³ Johnson Class Certification Report, par 60.

³⁴ See, e.g., Massimo Motta, *Competition Policy: Theory and Practice* (Cambridge University Press, 2004), p. 144. (“If a firm has participation in a competitor, even without controlling it, the scope for collusion will be enhanced.”)

³⁵ Johnson Class Certification Report, par. 104.

activities.³⁶ Also, Mitsubishi owned close to 20 percent share of another alleged conspirator, Thai-CRT.³⁷ Irico apparently had technology exchange programs with Samsung³⁸ and Toshiba.³⁹ Daewoo (parent company of Orion), along with Toshiba and other entities, formed TEDI to manufacture CRTs in Indonesia.⁴⁰

2. The Alleged Conspirators Recognized the Benefits from Successful Collusion

25. I described in my Class Certification Report how “[t]he overarching goal of the alleged conspiracy was to maintain and elevate CRT prices.”⁴¹ The alleged conspirators recognized that intense competition and declining prices would hurt their profits and that there were benefits from establishing and maintaining a collusion. As one of the alleged conspirators’ meeting notes stated: “Talking with *Competitor* regularly is very fruitful.”⁴² (emphasis original) Documents discussed the alleged conspirators’ incentives and efforts to maintain and raise CRT prices. For example, a Chunghwa document stated:

[I]t can be understood that one might reduce their price in order to sell, however if the price drops too low, it will not help to increase sales, but instead cause each maker to keep cutting the price and bleed.⁴³

³⁶ Johnson Class Certification Report, par. 103.

³⁷ “Thai CRT Co., Ltd. (TCRT) Restructures Ownership,” SCG, https://scc.listedcompany.com/news.html?id/216564/group/newsroom_press.

³⁸ SDCRT-0091524E. (A 2005 meeting minutes titled “Competitor China Visit Report” “Irico Meeting Report:” “I had an opportunity to visit [SDIs] Shenzhen factory in 1997 and also the Korea HQ in 1998 as part of a technology exchange program so I’ve learned a lot about factory management and overall operation.”)

³⁹ IRI-CRT-00031944E.

⁴⁰ Johnson Class Certification Report, par. 100.

⁴¹ Johnson Class Certification Report, par. 31.

⁴² CHU000028283E at 283E.

⁴³ CHU00028396E at 396.01E.

26. Notes from other meetings reflect this understanding:

To control the big CDT picture and to avoid accelerated deterioration, CPT/LPD/SDI settled: together KEEP the price in the short term to ensure that the 3 makers can KEEP a definite profit.⁴⁴ (emphasis original)

[IRICO] absolutely had no intention to compete with CPT. [] They were very thankful for CPT [Chunghwa] appropriately providing much information on the market situation so that IRICO last year was able to raise prices without worry and have better profit.⁴⁵

27. Documents indicate that the alleged conspirators were aware that their meetings were contrary to antitrust laws and recognized the risks associated with those activities being discovered. The documents show internal warnings to keep the industry meetings confidential.⁴⁶ For example, one of the meeting notes from 1999 stated that “[t]he industry meetings should remain confidential in consideration of international antitrust laws.”⁴⁷ Another meeting document stated: “Given that holding meetings with peers in the industry violates free market mechanism, it is not suitable to leave

⁴⁴ CHU00624682E at 682E. Other examples include: CHU00028803 at 803.01E-803.02E (“on 14” CDT selling price [SDD’s Mr. Kim] hopes to cooperate with Chunghwa and maintain current selling price [] to prevent mutual profit losses again.”), CHU00028385E at 386E (“Japan makers have been requested to join in to enable the entire industry to return to healthy and profitable operations.” And also, “[t]hey will control output volume, restricting price with volume. At that time, they will ask that Japan makers also join in. They would rather make less [CRTs], not make more and lose more [profit]”), SDCRT-0086557E at 557E (“Matter of 17” price increase → All companies successfully completed price increase.” And, referring to the industry collusion, “[b]ecause there is a big possibility of losing the trust of the entire industry with the low price offer, it was decided that the prices discussed are to be applied as the standard to the future price operations (emphasis original.”), CHU00029191E (“all makers agreed that as long as everyone synchronizes the price-up implementation, even at the risk of suffering slow business for one month because customers hesitated or were taking a wait-and-see attitude, eventually we would pull through and would definitely accomplish the price-hike targets according to schedule”).

⁴⁵ CHU00031101E.

⁴⁶ Johnson Class Certification Report, par. 34.

⁴⁷ SDCRT-0086672E-SDCRT-0086674E at 672E.

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any evidence on paper.”⁴⁸ Another meeting document stated: “Should pay attention to keep the secret of Glass meeting.”⁴⁹ Testimony by the Chunghwa representative confirmed that conspirators attempted to keep the meetings secret:

Q. Between 1995 and 2005 did the group meeting participants do anything to keep the meetings secret?

A. Certainly.

Q. What type of things did you do to make sure that the meetings would not be disclosed?

A. What we did was that not many people were assigned to attend such meetings and these assigned people should not be changed frequently and meetings shall not be discussed among CPT peoples internally. Externally when we had meetings in hotels, no group entry at the same time; we should walk into the meeting venue separately. Also no public information board on sight in the hotel.⁵⁰

28. Notwithstanding conspirators’ recognition of risks involved in their collusive activities, these activities continued for years. Economists have recognized that in order for firms to choose to engage in collusion, the returns must outweigh the costs associated with the risk of legal liability.⁵¹ Thus, as an economic matter, it would not have made sense for the alleged conspirators to expend resources and effort on risky illegal activities, over the course of many years, if they did not think that the activities

⁴⁸ CHU00578883E-CHU00578885E at 883.01E.

⁴⁹ CHU00647932-CHU00647943 at 943.

⁵⁰ Deposition of Chih Chun-Liu Vol. 1 (Chunghwa), February 19, 2013 at 93:22-94:13.

⁵¹ See, e.g., Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, 4th ed. (Pearson, 2005), 131. (“Only if a cartel is expected to raise the price above the noncartel price and keep it high do firms join. If the noncartel price is close to the cartel price, then firms may not believe that joining the cartel is profitable given the legal liability they potentially face from belonging to a cartel.”)

were having the intended result of elevating prices and profits. Otherwise, they would not have continued their activities and the conspiracy would have fallen apart.

3. The Conspirators' Activities Were Consistent with Effective Collusion

29. I described in a previous report my understanding of the organization and operation of the conspiracy, as alleged by Plaintiffs. This included discussion of the extensive documentation of communications among the alleged conspirators.⁵² As I describe below, the alleged conspirators took actions they expected to increase CRT prices and their profits. These actions would have been in their interest and have had the desired effect of elevating prices and profits only through coordination, i.e., these actions were inconsistent with the unilateral self-interest of the alleged conspirators.
30. The collusive activities of the alleged conspirators can be broadly grouped into the following categories:
 - a. Organization of frequent, structured, hierarchical meetings;
 - b. Explicit coordination on prices;
 - c. Explicit coordination on output (production and capacity);
 - d. Explicit coordination in market shares and customers;
 - e. Exchanges of competitively sensitive information, including on prices, output, capacity, products, and customers;
 - f. Monitoring potential cheating and enforcing the agreements.

a) Organization of Frequent, Structured, Hierarchical Meetings
31. The alleged conspirators organized frequent hierarchical meetings which involved both one-on-one communications and group meetings at various levels of the

⁵² Johnson Class Certification Report, par. 30-52.

organizations.⁵³ Economic literature recognizes that cartels organized in such structured manner are more likely to be successful.⁵⁴

b) Explicit coordination on prices

32. Documents show the alleged conspirators engaging in explicit price coordination.⁵⁵ In my Class Certification Report, I discussed this evidence in detail.⁵⁶ As an economic matter, successful coordination to elevate prices above the competitive market levels clearly harms purchasers and is anticompetitive.

c) Explicit coordination on output

33. Documents also show the alleged conspirators agreeing to reduce output and capacity and engaging in explicit coordination to achieve that end.⁵⁷ In my previous reports, I described documents discussing alleged conspirators' efforts to impact CRT prices through output and capacity reductions.⁵⁸ As with price coordination, such coordination is anticompetitive because it too is directed towards elevating prices above competitive market levels.⁵⁹

d) Explicit coordination in market shares and customers

34. The alleged conspirators' meetings and communications described collusively allocating market shares and customers.⁶⁰ Such collusion is anticompetitive because it

⁵³ Johnson Class Certification Report, par. 32.

⁵⁴ See, e.g., Margaret C. Levenstein and Valerie Y. Suslow, "What Determines Cartel Success?", *Journal of Economic Literature*, 44, no 1 (2006)4, 43-95. ("[Successful cartels] develop an elaborate internal hierarchy that allows communication on various levels (executive and middle-management) not only to provide flexibility in the details of the agreement, but to build trust as well.")

⁵⁵ Johnson Class Certification Report, par. 50-52.

⁵⁶ Johnson Class Certification Report, par. 50-52.

⁵⁷ Johnson Class Certification Report, par. 49.

⁵⁸ Johnson Class Certification Report, par. 44-56; Johnson Class Certification Reply Report, par. 7.

⁵⁹ See discussions in Johnson Class Certification Report, par. 44-49; Johnson Class Certification Reply Report, par. 7.

⁶⁰ Johnson Class Certification Report, par. 47-48.

limits competition for customers' business and, as a consequence, also tends to result in prices that are elevated above competitive market levels.⁶¹

e) Exchanges of competitively sensitive information

35. In addition to proposing, and apparently agreeing to, price and production levels, the alleged conspirators' collusive activities included exchanging information about their own prices, production, sales, customers, and other competitively sensitive information. Economic theory and literature provide guidance on the kinds of communications among competitors that are likely to be anticompetitive. Economists recognize that information exchanges, such as the ones conducted by the alleged conspirators, are anticompetitive in nature. To quote one study on this topic:

[T]here is never a mutual incentive for all firms in an industry to share [private information] unless they may cooperate on strategy once information has been shared.⁶²

36. The FTC and DOJ Antitrust Guidelines also state that “[a]greements that facilitate collusion sometimes involve the exchange or disclosure of information”⁶³ and describe the anticompetitive nature of the type of information shared by alleged conspirators in this case:

The competitive concern depends on the nature of the information shared. Other things being equal, the sharing of information relating to price, output, costs, or strategic planning is more likely to raise competitive concern than the sharing of information relating to less competitively sensitive variables. Similarly, other things being equal, the sharing of information on

⁶¹ Market share allocation has also been recognized as an effective way to deter cheating. See, e.g., George J. Stigler, “A Theory of Oligopoly,” *Journal of Political Economy* 72 (1964), 46. (“Fixing market shares is probably the most efficient of all methods of combatting secret price reductions.”)

⁶² Richard N. Clarke, “Collusion and the incentives for information sharing,” *Bell Journal of Economics* 14, issue 2 (1983), 383.

⁶³ Antitrust Guidelines for Collaborations Among Competitors, Issued by the Federal Trade Commission and the U.S. Department of Justice, April 2000, 15. (“FTC and DOJ Antitrust Guidelines on Communications Among Competitors”) https://www.ftc.gov/sites/default/files/documents/public_events/joint-venture-hearings-antitrust-guidelines-collaboration-among-competitors/ftcdojguidelines-2.pdf.

current operating and future business plans is more likely to raise concerns than the sharing of historical information. Finally, other things being equal, the sharing of individual company data is more likely to raise concern than the sharing of aggregated data that does not permit recipients to identify individual firm data.⁶⁴

37. There are numerous examples of these kinds of anticompetitive information exchanges among the alleged conspirators, including exchanging information on their firm-specific production and capacity, customer-specific prices, firm-specific production costs, and strategic planning.⁶⁵
38. **Alleged conspirators exchanged information on their current and future production and capacity.** For example, Samsung discussed its current CDT production and Korean makers' forecasted 14" and 15" CDT production volume in Q2 1996 with Chunghwa in an April 1996 meeting.⁶⁶ Notes from a September 1998 meeting attended by Chunghwa, SDI, LG, Orion, and Thai-CRT include a review of respective makers' Q4 1998 production capacity and product quantity and "a simulated adjustment of each maker's Q4 production volume plan."⁶⁷ Notes from a February 2004 Glass Meeting includes a table of CPT production capacity by maker and size at various sites.⁶⁸
39. **Alleged conspirators exchanged information on customer-specific prices.** For example, notes from a September 1998 meeting attended by Chunghwa, SDI, LG, Orion, and Thai-CRT include a review of respective makers' selling prices of CPTs in Q4 1998 to specific customers (TV makers) such as Aiwa, SREC, and Funai by

⁶⁴ FTC and DOJ Antitrust Guidelines on Communications Among Competitors, 15-16.

⁶⁵ I have discussed many exchanges of such information in my Class Certification Report. See Johnson Class Certification Report, par. 31-51.

⁶⁶ CHU00028815E at 815E-816E.

⁶⁷ CHU00029262E at 263.02E.

⁶⁸ CHU00030036E at 036.01E-036.02E. Other examples of information exchanges on production volume and capacity include CHU00028786E at 786.01E-787.01E, CHU00028909E at 909E, CHU00030745E at 745.01E-746.02E, CHU00660728 at 732, and CHU00020661E at 661.01E-661.02E.

maker.⁶⁹ In an October 1999 meeting Chunghwa and Samsung discussed “SDD/PH/CPT’s current sales prices [of 17” CDT] to the customers,” which included Acer, EMC, and Sampo.⁷⁰ Also, notes from an October 1996 meeting between Chunghwa and LG state: “Mr. Huh claims that LG is also discussing business for year ’97 with IBM/Compaq etc. IBM’s 17” price request for year ’97 is USD 325.00. Compaq’s requested 14” price for year ’97 is USD 139.00.”⁷¹

40. **Alleged conspirators exchanged information on their production costs.** For example, notes from an April 1999 meeting of Chinese CDT makers state: “[c]ompared with 1998, IRICO’s 15” CDT import materials and parts costs have decreased, and its processing technology has been improved. At present, its electronic guns are manufactured by assembling imported spare parts.”⁷²

Notes from a September 1996 meeting between Chunghwa and Toshiba state:

[Toshiba] also claimed that its customers indicated that 14” Monitor set’s FOB prices can be about USD 130.00. CPT [Chunghwa] responded that it was impossible. Given the current 14” chassis cost of USD 48~50, labor costs (China) of USD 6~8, even if Overhead is not included in the calculations, CPT tubes’ selling prices will easily drop to about USD 74.00.⁷³

Notes from a December 1998 meeting between Chunghwa and Mitsubishi state:

⁶⁹ CHU00029262E at 262E-263.01E.

⁷⁰ CHU00028599E at 599.01E.

⁷¹ CHU00028909E at 909E. Other examples of information exchanges on prices to customers include: CHU00029175E at 175.01E-177E, CHU00030036E at 038.01E-038.02E, CHU00031221E at 223.01E, CHU00020661E at 661.02E-662E, CHU00028606E at 606.01E-606.02E, and CHU00028670E at 670E-671E.

⁷² CHU00030745E at 746.01E.

⁷³ CHU00028293E at 293.02E-294E.

The hope is that the 17" costs can be below USD 100, only that the materials are too expensive. Mask is too expensive. Yun: 1000 yen (target 700 yen), CPT: USD 3, DY: USD 22~20, CPT: USD 14.⁷⁴

41. **Alleged conspirators exchanged strategic planning information.** For example, notes from a November 2005 meeting state:

Orders for 21" CPT are rising. SDI Shenzhen factory is strategically reducing the 17" F CDT production volume; producing more 21" CPT in response.⁷⁵

Notes from an April 1999 meeting of Chinese CDT manufacturers state:

Mr. Wang [of Irico] indicated that the company will be striving to increase its production by about 800 ~ 900K in 1999 compared with the previous year, and also to reduce the level of losses by 1/2.⁷⁶

Notes from an August 1999 meeting of CDT manufacturers state:

Meeting attendees agreed that, in order to effectively ensure price level, 17" tube production shutdown period needs to be at least 5 days in September. Each maker will provide a production stoppage plan before 8/24, and complete Audit plans for related factory zone before 8/28.⁷⁷

⁷⁴ CHU00028532E at 533E. Other examples of information exchanges on costs include CHU00028589E at 589.02E, and SDCRT-0006632E at 632E.

⁷⁵ CHU00014218E at 218.01E.

⁷⁶ CHU00030745E at 746.01E.

⁷⁷ CHU00030835E at 837E. Other examples of information exchanges on strategic planning include: CHU00028909E at 911E, CHU00005997E at 998E, and CHU00125162E at 162.02E.

- f) The alleged conspirators monitored for cheating and enforced their agreements

42. It is widely recognized that cartel members may be tempted to deviate (“cheat”) from agreements to gain more sales. However, some cheating may occur even in successful cartels.⁷⁸ In order to maintain the stability of cartels, cartel members establish mechanisms to monitor and enforce agreements, encourage that agreements are upheld by all participants, and avoid a breakdown of the cartel. To enforce agreement, cartels may punish cheating, however, research on cartels indicates that “[c]artels much prefer to develop the means to monitor each other’s behavior in order to deter or physically prevent cheating, rather than resorting to expensive punishments such as price wars.”⁷⁹

43. The alleged conspirators spent substantial effort on monitoring the activities of the cartel. Documents provide many examples of cartel members’ internal monitoring and enforcement of the agreements.

- a. Alleged conspirators met to monitor adherence to the agreements. For example, one document states:

Meeting on the monitoring of the implementation of the agreement reached among the 5 companies [] Quantity: Once/month [] Price: Once/month.⁸⁰

Notes from a May 1999 meeting state:

LG and [Orion] will contact TDDI (TSB Indonesia) and ask TDDI to FLW the price agreement. [] The hope is to

⁷⁸ See, e.g., Margaret C. Levenstein and Valerie Y. Suslow, “Breaking Up Is Hard to Do: Determinants of Cartel Duration,” *Journal of Law and Economics*, 54, no. 2 (2011). (“Cartels do not want to disrupt collusion – reducing profits and undermining trust – by retaliating when a firm has not cheated, and even sometimes when the *know* that a firm has cheated.” (emphasis original) “Many cartels suffer from a ‘little’ cheating; this cheating does not result in punishment, let alone cartel death.”); Margaret C. Levenstein and Valerie Y. Suslow, “What Determines Cartel Success?” *Journal of Economic Literature* 44, no 1 (2006), 44. (“[s]ufficiently patient and well-informed firms can, in principle, collectively deter cheating and allow collusion to survive.”)

⁷⁹ Margaret C. Levenstein and Valerie Y. Suslow, “What Determines Cartel Success?” *Journal of Economic Literature* 44, no 1 (2006), 44.

⁸⁰ SDCRT-0086416E at 418E.

hold a Working Level meeting in Thailand as soon as possible to push Thai-CRT to FLW resolutions from the meetings.⁸¹

Notes from a January 2002 meeting state:

SDI indicated that it plans to reconfirm the sales prices and make a report at the next meeting. If low pricing can be proven, it will then readjust the price back to the agreed prices between various parties.⁸²

Deposition testimony from Chunghwa's Chih Chun-Liu:

Q. And what did the group do when it was suspected that one of the competitors was cheating on the agreement? []
 THE WITNESS: Before the meetings evidence would be collected. We would find evidence to challenge this suspect at the meetings, "How could you do this?" To offer this company a chance to clarify or make improvements.⁸³

- b. Alleged conspirators communicated about purported cheating during meetings to enforce agreements. For example, one of the documents notes:

Especially, in the case of the price of 14" monitors, Philips and Chunghwa are trying to adhere to the agreed upon price by reducing the utilization rate whereas Orion is offering a lower price than the agreed price, so Chunghwa and Philips are complaining. [] They promised to adhere

⁸¹ CHU00029228E at 229.01E-229.02.

⁸² CHU00036392E at 392.01E. Other examples showing meetings discussing adherence to agreements include: MTPD-0423675E at 675E, SDCRT-0088732E at 732, SDCRT-0087934E at 935E, SDCRT-0086605E at 605E-606E, and CHU00029116E at 116.01E.

⁸³ Deposition of Chih Chun-Liu Vol. 2 (Chunghwa), February 20, 2013 at 368:6-15.

to the agreed upon price in the future.⁸⁴ (emphasis original)

Notes from a May 1997 meeting state:

In view of the order situation from AOC [a customer], CPT [Chunghwa] again complained strongly to Mr. Moon of Orion that it always uses a price USD2.00 lower than that of CPT's to grab share formerly with CPT. [] CPT questioned SDD/LG for their petty actions and for not abiding by the price bottom line in April.⁸⁵

Another document in 2004 states:

LPD presented SDI's shipment invoice to Delta, critically attacking SDI for failing to raise the price as promised earlier in the month, and as of May 16, is still giving shipment prices of U\$1 lower than the baseline.⁸⁶

- c. Alleged conspirators submitted factory shutdown reports to enable compliance with agreements to be monitored. For example, one document states:

In June [1999], 17" CDT production will stop for 5 days (25 operating days) to adjust the actual production volume in order to maintain the price level. [] Each company's nonoperation schedule to be submitted during the Taiwan meeting on May 28.⁸⁷

⁸⁴ SDCRT-0086449E at 449E.

⁸⁵ CHU00028730E at 731E.

⁸⁶ CHU00031249E at 249.02E. Other examples of documents discussing instances of perceived violation of the agreed-upon prices and criticisms from cartel members include: CHU00014210E at 210.02E, CHU00030665E at 666.01E, CHU00028209E at 210E, and CHU00660366E at 367E, and CHU00029179E at 180.01E.

⁸⁷ SDCRT-0086632E at 632E.

Notes from a March 1999 meeting state:

Submit production reduction plans (25-day operation plan) by next week and adjust/check the production by forming a separate monitoring team.⁸⁸

Meeting notes from a July 1999 meeting state:

[Various makers] needed to verify Audit plans [of production facilities and lines] and send them to PH [Philips] for compilation before Friday. Also, makers need to notify visiting/hosting staff and specify time of plant visit two days before Audit.⁸⁹

- d. Alleged conspirators visited competitors' facilities to monitor compliance on agreed production cuts. For example, Samsung's former General Manager stated:

[D]uring the early 2000's, the companies submitted the monthly closing days to stop operation on specific number of days, to notify the designated personnel in other companies, and to allow these people to actually visit the companies to check whether the agreements were being implemented. I visited competitors' factor[ies] on line audits in the first half of 1999. Also, I remember that the people from Chunghwa Picture Tubes and LPD visited our company.⁹⁰

Meeting notes from a June 1999 meeting state:

⁸⁸ SDCRT-0086563E at 563E.

⁸⁹ CHU00030807E at 808.01E. Other examples of documents discussing shutdown and capacity reduction plans include: CHU00031214E at 214.01E, CHU00030835E at 837E, SDCRT-0007588- SDCRT-0091718 at 90262. In addition, GSM presentations in 2001 include a table titled Shutdown Plan Schedule Review showing detailed shutdown plans by maker. See CHU00660454 at 462 and CHU00660408 at 414.

⁹⁰ Korean Fair Trade Commission, Multi-Party Meeting Decision Report, No. 2011-019 (March 10, 2011) (“KFTC Decision”), par. 39 (emphasis removed).

Results of the monitoring of Philips' Dapon factory []
 Result: #1, 19", #5 17" lines not operating⁹¹

Deposition testimony from Chunghwa's Chih Chun-Liu:

Q. And, sir, was there a plan to audit this work stoppage?
 THE WITNESS: We must conduct factory visits, otherwise some would cheat on this. If someone promised such a stoppage, but this factory failed to do so. This could mean this company would steal the market shares, so we did have plans to take such audit actions.⁹²

44. The documents show the alleged conspirators characterizing their collusive actions as having been successful. For example, one document states: "Up to now, the capacity adjustment for 17" CDT's has been proceeding smoothly as a result of cooperation among the companies."⁹³ Notes of an August 1998 meeting state "China and Korea makers have successfully adjusted prices beginning 1Q of August."⁹⁴ Chunghwa's Chih Chun-Liu confirmed in his deposition testimony that group meetings with the 7alleged co-conspirators helped keep prices elevated.⁹⁵ This view is also consistent with a statement from Chunghwa's president made to the Korean Fair Trade Commission on May 14, 2008, that "The information obtained through the CDT multi-party meetings was each company's confidential sales information not disclosed

⁹¹ SDCRT-0086641E at 643E. Other examples of factory visitations include: CHU00031075E at 075.01E, CHU00071480E at 481E-482E, SDCRT-0091599E at 602E, and CHU00031018E at 018.02E.

⁹² Deposition of Chih Chun-Liu Vol. 2 (Chunghwa), February 20, 2013 at 348:1-349:22. The testimony is in reference to Section C of Exhibit 1149 regarding an agreement on production line stoppage. The witness further stated "[e]very company is assigned to cross-audit other company's factory to see whether stoppage actually happened."

⁹³ SDCRT-0086632E at 632E.

⁹⁴ CHU00028385E at 386E.

⁹⁵ Deposition of Chih Chun-Liu Vol. 2 (Chunghwa), February 20, 2013 at 364:19-365:10. "Q. Do you agree, Mr. Liu, that in times of over-supply these group competitor meetings helped keep prices from falling as much as they would have? THE WITNESS: Agree. Q. And when there was a shortage of tubes, sir, do you agree that these group competitor meetings allowed suppliers to raise prices faster? [...] THE WITNESS: Agreed."

in the marketplace. I believed that such information allowed us to prevent the price from falling further, ensuring that we receive a higher price.”⁹⁶ (emphasis original)

4. Government Indictments and Findings

45. The alleged conspirators have been investigated by governmental authorities in the United States and abroad for their anticompetitive conduct in the CRT industry. Two alleged conspirators admitted to having participated in the CRT cartel. Samsung SDI pled guilty in March 2011 and agreed to pay a \$32 million fine to the United States Department of Justice for its role in a global conspiracy in the CDT cartel from “at least as early as January 1997, until at least as late as March 2006.”⁹⁷ Technicolor SA (formerly Thomson) also admitted in 2011 that “it played a minor role in the alleged anticompetitive conduct.”⁹⁸
46. The European Commission (EC),⁹⁹ Korean Fair Trade Commission (KFTC),¹⁰⁰ Japan Fair Trade Commission (JFTC),¹⁰¹ and Czech Competition Authority¹⁰² have also found that members of the alleged cartel colluded to fix prices, allocate

⁹⁶ KFTC Decision, Table 6. Other examples of documents acknowledging the success of cartel members’ collective actions on affecting prices include: CHU00030855E at 855.02E, CHU00030888E at 889.01E, CHU00030701E at 701.02E, and SDCRT-0086557E at 557E.

⁹⁷ “Samsung SDI Agrees to Plead Guilty in Color Display Tube Price-Fixing Conspiracy,” United States Department of Justice, March 18, 2011. <https://www.justice.gov/opa/pr/samsung-sdi-agrees-plead-guilty-color-display-tube-price-fixing-conspiracy>. DOJ also indicted six former executives of Samsung SDI in connection with the investigation.

⁹⁸ Technicolor Annual Report 2011 at 226.
https://www.technicolor.com/sites/default/files/medialib/document/regulateregulation_information_30_03_2012.pdf.

⁹⁹ “EU imposes record 1.47 billion euro cartel fine on Philips, five others,” Reuters, December 5, 2012. <https://www.reuters.com/article/uk-eu-cartel-crt/eu-imposes-record-1-47-billion-euro-cartel-fine-on-philips-five-others-idUKBRE8B40EJ20121205>.

¹⁰⁰ KFTC Decision.

¹⁰¹ Japan Fair Trade Commission, Cease-and-Desist Order and Surcharge Payment Orders against Manufacturers of Cathode Ray Tubes for Televisions, October 7, 2009. https://www.jftc.go.jp/en/pressreleases/yearly-2009/oct/individual-000037_files/2009-Oct-7.pdf.

¹⁰² “Cartel of color picture tube manufacturers fined,” Czech Office for the Protection of Competition, September 13, 2010. <https://www.uohs.cz/en/information-centre/press-releases/competition/1187-cartel-of-color-picture-tube-manufacturers-fined.html>.

customers and market shares, and limit production to restrict output, resulting in large fines to the cartel members.

III. The Alleged Conspiracy Elevated CRT Prices

A. Economic Evidence Demonstrates the Impact of the Alleged Conspiracy to Elevate CRT and CRT Product Prices to Class Members

47. Economic evidence discussed above, and in my Class Certification Report, shows that the alleged conspiracy would elevate global CRT prices above competitive levels. In particular:

- a. The structure of the CRT industry and the alleged conspirators' activities were consistent with effective collusion, i.e., collusion that would be sustained and result in elevated CRT prices (as discussed above).
- b. Given the legal risks recognized by alleged conspirators, these long-lasting collusive activities would only make economic sense if they had the desired effect on prices and profits (as discussed above).
- c. Documentary evidence shows that the alleged collusion was aimed towards elevating prices above competitive levels and alleged conspiracy recognized the impact on prices (see, e.g., Section II.B.3.f above).
- d. Analysis of CRT prices and CRT price targets in my Class Certification Report, demonstrates that target prices (one of the main collusive activities) impacted actual prices.¹⁰³
- e. Overcharge regression analysis below shows that CDT and CPT prices were elevated by 10.7 and 6.1 percent, respectively.

¹⁰³ Johnson Class Certification Report, par. 53-55. I have updated this analysis after including the new Irico Sales Data (described in Appendix B), which is included in the backup materials to this report. There are no material changes to the results of this analysis.

48. Economic evidence also shows that prices paid by the Class Members, specifically, would have been impacted by the conspiracy. In particular:

- a. The alleged conspiracy was global and the U.S. was one of the largest consumers of CRTs in the world.¹⁰⁴
- b. My analysis has shown the close relationship between CRT prices in North America, China, and the rest of the world.¹⁰⁵
- c. My analysis has shown that the alleged conspirators' target prices impacted actual prices in North America, as provided in my Class Certification Report.¹⁰⁶

49. Economic evidence shows that prices of CRT finished products were elevated by the alleged conspiracy. This evidence includes:

- a. The fundamental economic relationship between input costs (CRT) and costs of finished products (CRT monitors and TVs)¹⁰⁷
- b. Documentary evidence showing the alleged conspirators' understanding that elevated CRT prices would result in elevated CRT finished product prices.¹⁰⁸
- c. Analysis in my Class Certification Report showing that increases in CRT prices resulted in higher CRT finished product prices.¹⁰⁹

¹⁰⁴ Johnson Class Certification Report, par. 65-66.

¹⁰⁵ Johnson Class Certification Report, par. 67. I have updated this analysis after including the new Irico Sales Data (described in Appendix B), which is included in the backup materials to this report. There are no material changes to the results of this analysis.

¹⁰⁶ Johnson Class Certification Report, par. 56. I have updated this analysis after including the new Irico Sales Data (described in Appendix B), which is included in the backup materials to this report. There are no material changes to the results of this analysis.

¹⁰⁷ Johnson Class Certification Report, par. 90.

¹⁰⁸ Johnson Class Certification Report, par. 91-94.

¹⁰⁹ Johnson Class Certification Report, par. 95-97. I have updated this analysis after including the new Irico Sales Data (described in Appendix B), which is included in the backup materials to this report. There are no material changes to the results of this analysis.

B. Regression Estimation of the Overcharges

50. In this section I estimate the overcharges resulting from the alleged collusion using a regression model of CRT prices that includes various factors potentially affecting CRT supply and demand as well as variables designed to capture the price impact of the alleged collusion.
51. The model is based on the widely utilized “before/after” approach. I previously analyzed a similar regression model in my Class Certification Report.¹¹⁰ As I explained in that Report, the “before/after” approach is an appropriate method of estimating the elevation in CRT prices that was due to the alleged conspiracy. I utilize the periods before 1995Q2 and after 2007Q1 as benchmark periods, during which I understand Plaintiffs do not allege there to have been anticompetitive conduct.
52. The regression model includes controls for CRT demand and supply factors as well as allowing for persistence in CRT prices through a lagged dependent variable (i.e., including the CRT price in the previous quarter as an explanatory variable). These variables assist the regression model in isolating the impact of the alleged conspiracy from other factors that influenced global CRT market prices. The supply and demand factors include:
 - a. Cost of glass for CRT manufacturing;
 - b. Previous period CRT quantity sales;
 - c. The LCD share of total LCD-CRT sales;
 - d. G7 Industrial Production Growth and G7 Unemployment Rate;
 - e. Technological and other trend-inducing market factors (variables allowing for non-linear trend);
 - f. CRT product (manufacturer-application-size-model fixed effects).
53. Since my last report, I have received additional data produced by Irico. The data include sales of CRTs made by Irico entities from 1995 to 2007 (“Irico Sales Data”).

¹¹⁰ Johnson Class Certification Report, par. 72-78.

In Appendix B, I describe these data in more detail. I incorporated the Irico Sales Data into the analysis dataset used in the overcharge regression (and other analyses). The overcharge regression results are shown in Figure 3 (“base overcharge model”).

54. I calculate quantity-weighted average percentages by which CRT prices were elevated in each quarter of the Class Period (i.e., overcharge percentages), using the estimated coefficients on the “conspiracy” variables and the lagged CRT price variable. Figure 4 and Figure 5 illustrate the quarterly average global CDT and CPT prices and the estimated “but-for” prices that would have prevailed absent the alleged conspiracy. I estimate that, during the Class Period, CDT prices were elevated on average by 10.7 percent and CPT prices were elevated by 6.1 percent.

Figure 3: Overcharge Regression

Variable	Coefficient	Std.-Error ⁹	T-value	Clustered P-value
(1)	(2)	(3)	(4)	(5)
<i>Dependant Variable</i>				
Log(CRT Price) ¹				
Conspiracy Indicator 1 * CDT ^{2a}	0.0762 ***	0.024	3.135	0.002
Conspiracy Indicator 1 * CPT	0.0443 **	0.018	2.492	0.013
Conspiracy Indicator 2 * CDT ^{2b}	0.0292 *	0.015	1.911	0.057
Conspiracy Indicator 2 * CPT	0.0611 ***	0.013	4.891	0.000
Log CRT Price (-1)	0.2867 ***	0.058	4.981	0.000
Log CRT Quantity (-1)	-0.0061 ***	0.001	-4.540	0.000
Dlog CRT Quantity (-1)	0.0062 ***	0.001	6.781	0.000
Log BLS Glass Price (-1) ³	0.2543 **	0.104	2.441	0.015
Dlog BLS Glass Price	0.0812	0.132	0.613	0.540
Log BOK Glass Price (-1) ⁴	0.2655 ***	0.056	4.732	0.000
Dlog BOK Glass Price	0.3357 ***	0.082	4.103	0.000
LCD/(LCD+CRT) Sales (-1) * CDT ⁵	-0.3350 **	0.137	-2.447	0.015
LCD/(LCD+CRT) Sales (-1) * CPT	-0.7205 ***	0.119	-6.031	0.000
LCD/(LCD+CRT) Sales (-1)^2 * CDT	-0.1685	0.138	-1.218	0.224
LCD/(LCD+CRT) Sales (-1)^2 * CPT	0.1902 **	0.080	2.376	0.018
G7 Industrial Growth ⁶	0.0030	0.003	1.028	0.305
G7 Unemployment Rate ⁷	-0.0544 ***	0.010	-5.311	0.000
Trend	-0.0039 ***	0.001	-3.846	0.000
Trend-squared	0.0003 ***	0.000	5.500	0.000
Constant	2.8524 ***	0.569	5.015	0.000
Fixed Effects ⁸	YES			
Observations	28,187			
R-squared	0.977			

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level

¹ Quarterly average transaction price weighted by quantity for each application-size-manufacturer-model code.

^{2a} Conspiracy Indicator takes the value one from 1995Q2-2006Q2.

^{2b} Conspiracy Indicator takes the value one from 2006Q3-2007Q1.

³ Producer price index for machine-made pressed and blown lighting, automotive, and electronic glassware from BLS.

⁴ Producer price index of CRT glass from Bank of Korea.

⁵ Total LCD/(LCD + CRT) sales ratio by application. Extrapolated in years with missing data.

⁶ Quarterly Growth Rate of Industrial Production for G7 member countries.

⁷ Quarterly Unemployment Rate for G7 member countries.

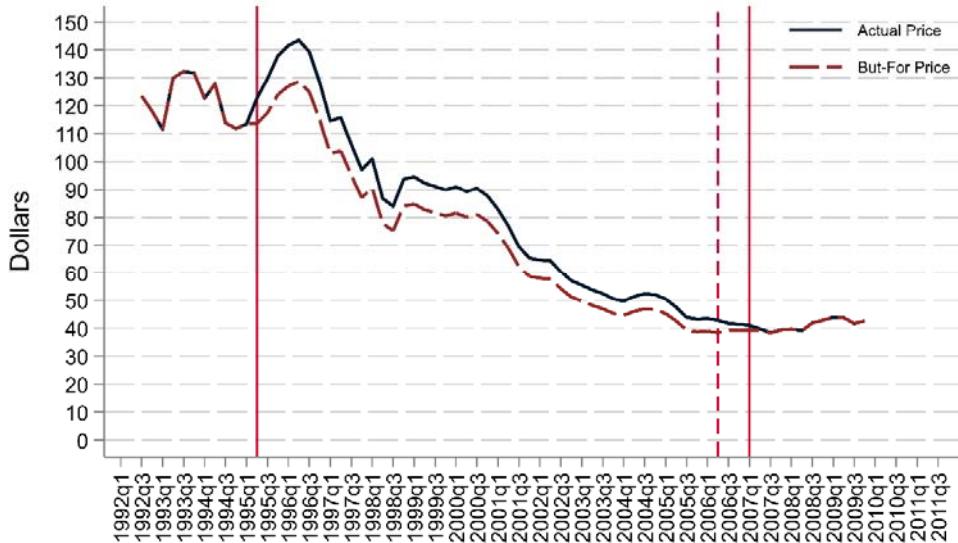
⁸ Fixed effects by application-size-manufacturer-model code are included.

⁹ Cluster Robust Standard Errors by Manufacturer-Quarter.

Source: CRT Manufacturers' Sales Data; DisplaySearch; Bank of Korea; U.S. BLS; OECD

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Figure 4**Quarterly Average Actual and But-For Prices
CDT**

Note: Prices adjusted for the manufacturer-model fixed effects.
Source: CRT Manufacturers' Sales Data; Overcharge Regressions.

Figure 5**Quarterly Average Actual and But-For Prices
CPT**

Note: Prices adjusted for the manufacturer-model fixed effects.
Source: CRT Manufacturers' Sales Data; Overcharge Regressions.

55. **Conspiracy Indicators.** My base model utilizes separate controls for the main conspiracy period (1995Q2-2006Q2) and the later period when the alleged collusion may have changed in effectiveness (2006Q3-2007Q1).¹¹¹ Using the additional conspiracy variables places a heavier burden on the data to identify the impact. I test the hypothesis that the conspiracy effect was the same in each of the two conspiracy periods for both CDTs and CPTs. The hypothesis that the CDT effect was the same in each period is rejected but the hypothesis that the CPT effect was the same in each period is not. Therefore, I present a sensitivity regression that estimates a single conspiracy effect for CPT but separate effects for the two periods for CDT. This modification results in a larger average class-wide overcharge for CPT (7.7 percent). See Figure 6. I retain the specification with separate conspiracy indicators for my base model for consistency with the alleged conduct, consistency between the approach for CDT and CPT, and for conservativeness.

56. **Prices adjusted for post-transaction discounts and rebates (“Net Price”).** CRT transactional data produced by the alleged conspirators contained discounts and rebates that could not be matched to specific original transactions. In my base overcharge model, I used prices unadjusted for these discounts and rebates. Here, I conduct a sensitivity of the overcharge estimates by using prices after making an approximate aggregate adjustment for these discounts and rebates to original prices (“net prices”).¹¹² Replacing unadjusted prices with these net prices results in higher overcharge estimate (11.1 percent) for CDT and no material difference (5.8 percent) for CPT. See Figure 6. I do not adopt this modification for my base model because discounts and rebates could only be assigned through an apportioning process that I believe diminishes the reliability of the CRT price data.

¹¹¹ See my Class Certification Report for the description of the use of these periods. Johnson Class Certification Report, par. 74-76.

¹¹² The calculations for these adjusted prices were provided in the backup to my Class Certification Report.

Figure 6: Overcharge Regression Sensitivity

Model	CDT						CPT					
	Conspiracy Indicator 1		Conspiracy Indicator 2		Average Overcharge	Conspiracy Indicator 1		Conspiracy Indicator 2		Average Overcharge		
	Coeff	T-Stat	Coeff	T-Stat		Coeff	T-Stat	Coeff	T-Stat			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		
1. Base Model	0.08	3.14	0.03	1.91	10.7%	0.04	2.49	0.06	4.89	6.1%		
2. Single Period for CPT	0.08	3.23	0.03	1.97	10.9%	0.06	4.41			7.7%		
3. Net Prices	0.08	2.85	0.03	1.83	11.1%	0.04	2.14	0.06	4.86	5.8%		

IV. Economic Evidence of Irico's Participation in the Alleged Collusion

A. Irico Along with Other Alleged Conspirators Were Part of a Global CRT Market

57. In this section I discuss Irico's participation in the global CRT industry along with other alleged conspirators, adding to my previous discussion of that topic in my Class Certification Report¹¹³ using recently produced Irico Sales Data.

58. During the Class Period, Irico produced and sold both CDTs and CPTs, though most of its products were CPTs. During the Class Period, CDTs accounted for just 2 percent of Irico's CRT sales. In 2002, Irico apparently discontinued its CDT production.¹¹⁴ Irico's CDT sales, prior to discontinuing them, accounted for less than 1 percent of global CDT sales.¹¹⁵ Irico's CPT sales accounted for between 4 and 8 percent of global CPT sales between 2000 and 2006.¹¹⁶

59. As described above, while colluding on CRTs generally, documents show the alleged CRT conspirators also specifically set target prices for CRT products.¹¹⁷ These

¹¹³ Johnson Class Certification Report, par. 24-25.

¹¹⁴ Letter from Joseph R. Tiffany II, January 15, 2009, "Response of Irico Group Corporation and Irico Display Devices Co., Ltd. To Plaintiffs' Information Requests" at 4.

¹¹⁵ Johnson Class Certification Report, Figure 5.

¹¹⁶ Johnson Class Certification Report, Figure 6.

¹¹⁷ These products are described in Johnson Class Certification Report, par. 51-52.

targeted CRT products accounted for over 98 percent of Irico's sales during the Class Period. See Figure 7 below. Specifically, Irico's sales were predominantly three products: CPT 21", CPT 14", and CPT 25" – all of which were CRTs targeted by the alleged conspiracy. These three products together accounted for over 93 percent of Irico's sales during the Class Period. Additionally, CDT 15" accounted for 1.7 percent, CPT 15" and 29" accounted for about 1.4% each. Moreover, Irico's products substantially overlapped with the market. Irico's top two products, CPT 14" and 21", accounted for about a third of total CRT sales by alleged conspirators and over half of CPT sales. A more detailed summary of shipments and revenues in Irico's Sales Data, by year, are shown in Appendix B.

Figure 7
Irico CRT Products

Product Type	Size	Share of Total Shipments	
		(1)	(2)
1. Targeted			
CPT	21		41.4 %
CPT	14		33.5
CPT	25		19.0
CDT	15		1.7
CPT	29		1.4
CPT	15		1.4
CDT	14		0.1
CPT	20		0.0
Total Targeted			98.5 %
2. Other			
CPT	18		1.1 %
CPT	22		0.3
CPT	16		0.0
CDT	16		0.0
CPT	17		0.0
CPT	26		0.0
CPT	23		0.0
CPT	24		0.0
CPT	19		0.0
Total Other			1.5 %

Note: Sales of CRT products unidentified as CDT or CPT not included.

“Targeted Products” are CRTs for which target prices were found.

Source: CRT Manufacturers' Sales Data; Conspiracy Documents.

60. Irico's sales data confirms that it sold most of its CRTs in China.¹¹⁸ Domestic sales accounted for approximately 80 to 95 percent of Irico's sales from 1995 to 2003, 100 percent in 2004, and between 65 to 88 percent between 2005 and 2007.¹¹⁹

¹¹⁸ Johnson Class Certification Report, par. 24.

¹¹⁹ Sales amounts by year are shown in Appendix B.

61. That Irico's primary business was in China does not mean it was disconnected from the global CRT market. As I described previously, in addition to the CRT market being global, the alleged conspiracy had a global reach.¹²⁰ Irico both participated in the alleged conduct with its alleged co-conspirators and sold CRTs abroad as well as within China.

62. In China, several alleged conspirators had Chinese subsidiaries that also produced and sold CRTs.¹²¹ These include:

- Beijing-Matsushita Color CRT Company, Ltd., or "BMCC," is a joint venture between Panasonic and Beijing People's Republic, established in 1987 to produce color picture tubes for color TVs.¹²² BMCC manufactured and sold CPTs until Panasonic sold its 50 percent stake in the venture to its Chinese partner in 2009.¹²³
- Shenzhen Samsung SDI Co., Ltd. and Tianjin Samsung SDI Co., Ltd. are Chinese subsidiaries of Samsung SDI,¹²⁴ with CRT manufacturing facilities in Shenzhen and Tianjin.¹²⁵
- CPTF Optronics Co., Ltd (CPTFO), was a Chinese subsidiary of Chunghwa Picture Tubes Co., Ltd., which manufactured and sold

¹²⁰ Johnson Class Certification Report, par. 65.

¹²¹ Forbes.com, "China picture tube makers promise support for Skyworth Digital - report," December 3, 2004. "Eight major color picture tube manufacturers in China ... include Beijing Matsushita Color CRT Co Ltd, Irico Group, Samsung Electronics, LG Philips Displays China, Shenzhen SEG Hitachi Color Display Devices Co Ltd, Thomson Guangdong Display Co Ltd, Shanghai Novel Color Picture Tube Co Ltd and Nanjing Huafei Co Ltd."

¹²² Panasonic, "Joint venture company with Beijing established," <https://holdings.panasonic/global/corporate/about/history/chronicle/1987.html>.

¹²³ TechCrunch, "After 55 years: Panasonic pulls the plug on tube TV production," October 1, 2009. <https://techcrunch.com/2009/10/01/after-55-years-panasonic-pulls-the-plug-on-tube-tv-production/>.

¹²⁴ Samsung Electronics, Annual Report 2002, 123. https://images.samsung.com/is/content/samsung/p5/tw/aboutsamsung/2002_Will.pdf.

¹²⁵ See MTPD-0416090 showing CPT production at Shenzhen and Tianjin sites for (Samsung) SDI during 2000-2006.

CRTs in China.¹²⁶ Chunghwa announced closures of CRT and CPT production lines in mainland China in 2008.¹²⁷

- Hua Fei Color Display Systems Co. Ltd. is a Chinese CRT manufacturer based in Nanjing, China. It is a joint venture between Philips and Chinese partners, in which Philips gained a majority stake in 1996.¹²⁸ Hua Fei Color Display Systems and LG Shuguang Electronics Co., another CRT manufacturer located in Changsha, China, are subsidiaries of LG Philips Displays.¹²⁹
- Shenzhen SEG Hitachi Color Display Devices, Ltd. is a Chinese joint venture between Hitachi and China-based Shenzhen SEG Zhongdian Color Display Devices¹³⁰ that produced CRTs. Hitachi sold its entire 25 percent stake in the venture in late 2007.¹³¹
- Thomson Guangdong Display Co. Ltd (TGDC) is a Chinese, majority-owned subsidiary of Thomson. Thomson and TGDC acquired another Chinese tube manufacturer, Fortune, in 2003.¹³²

¹²⁶ Chunghwa Picture Tubes, Ltd. and Subsidiaries, “Consolidated Financial Statements for the Six-Month Periods Ended June 30, 2005 and 2006 with Review Report of Independent Auditors (Unaudited),” August 21, 2006, 7-9. See also SDCRT-0201291 showing Chunghwa Picture Tubes’ CDT production in Fuzhou, China.

¹²⁷ EMSNow, “CPT closes CRT/CDT production lines in Mainland China,” February 6, 2008. <http://www.emsnow.com/newsarchives/archivedetails.cfm?ID=21702>.

¹²⁸ AP News, “Philips Increases Stake in Chinese Television Tube Producer,” March 4, 1996. <https://apnews.com/article/2ffacee57efd5fbdb2a68603afb3f40d>.

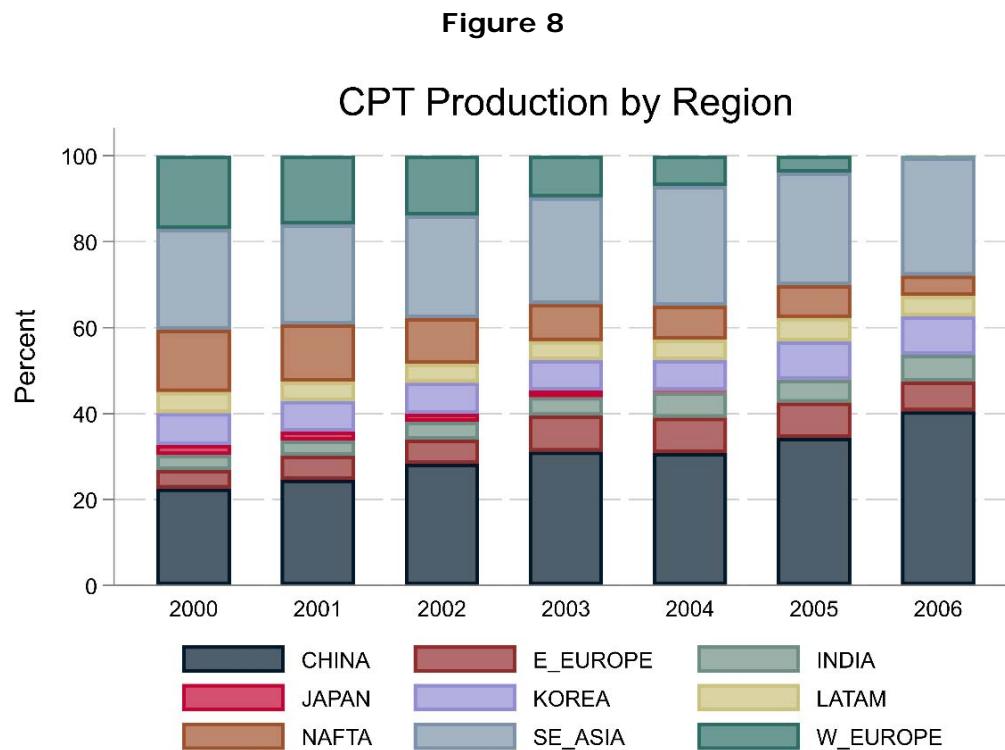
¹²⁹ LG Philips Displays, Prospectus, August 26, 2002, 45-46. <https://dl.bourse.lu/dl/anonymous?v=dYIVqD4we22tsL61QzI27CyXmLhat5/PNJcYRJZTMYFOOLgDdw/LuPm6q5Aaioea54Bfy3964Tu9XaYaPyF30gMnuDCcpih5Yv3VUrBzt8iDQH11oVuI/dUbbvcDeIIzN74eV/AeJ4qx1f1PrJi1hoyYO9BII9+ayWw6N4dTTw=>. See also CHWA00226236-CHWA00226269 at 44.

¹³⁰ Businessweek, “Company Overview of Shenzhen SEG Hitachi Color Display Devices Co., Ltd.,” <http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=38948436>. See also CHWA00226236-CHWA00226269 at 44 and MTPD-0416090.

¹³¹ Engaget, “Hitachi unsurprisingly looks to sell stake in CRT operations,” November 28, 2007. <https://www.engadget.com/2007-11-28-hitachi-unsurprisingly-looks-to-sell-stake-in-crt-operations.html>.

¹³² Forbes.com, “China picture tube makers promise support for Skyworth Digital - report,” December 3, 2004, https://www.forbes.com/feeds/infoimaging/2004/12/03/infoimagingcomtex_2004_12_03_xn_0000-

63. China was one of the top producing countries of CPTs in the global market. As shown in Figure 8, in 2000 over 20 percent of global CPTs were produced in China. This share gradually increased to over 40 percent in 2006.



Source: MTPD-0416090.

64. As shown in Figure 9, Irico was the second largest CPT manufacturer in China and produced close to 20 percent of the CPTs between 2000 and 2006 (nearly as much as the top manufacturer in China, LPD (another alleged conspirator)).

459336-KEYWORD.Missing.html. TGDC was formerly known as Thomson Foshan Colour Picture Company Ltd. Thomson, "United States Securities and Exchange Commission: 2004 Form 20-F/A," Washington, DC, December 22, 2005, F-81, <https://www.sec.gov/Archives/edgar/data/1080259/000117099705000054/m20f.htm>. See also CHWA00226236-CHWA00226269 at 44.

Figure 9
Share of CPT Production in China by Manufacturer
2000-2006

Manufacturer	2000	2001	2002	2003	2004	2005	2006	Average Share
	(Percent)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LPD	22.2 %	20.6 %	20.4 %	20.9 %	18.8 %	21.0 %	22.5 %	20.9 %
IRICO	18.7	19.0	18.6	18.9	20.5	20.7	18.4	19.3
SDI	10.8	11.6	14.2	15.1	15.7	16.4	16.8	14.9
MTPD	13.6	14.9	14.9	13.4	13.0	13.3	12.9	13.6
NOVEL	12.9	13.7	11.5	11.3	10.4	7.9	6.8	10.1
SEG-HITACHI	9.2	9.4	7.8	7.8	9.3	8.2	8.3	8.5
VIDEOCON	2.6	3.2	3.2	3.4	11.8	12.1	13.9	8.1
DONGGUAN	8.9	6.8	8.7	8.6	0.0	0.0	0.0	3.9
SONY	1.1	0.9	0.7	0.6	0.7	0.4	0.3	0.6

Source: MTPD-0416090

65. A substantial portion of the CRT TVs sold in the U.S. were imported,¹³³ including imports from China.¹³⁴
66. I described previously that Irico's identification of its CRT customers included customers that also purchased CRTs from its alleged co-conspirators.¹³⁵ The Irico Sales Data confirms this. As shown in Figure 10 below, a substantial share of Irico's external sales¹³⁶ went to customers who also purchased from other alleged conspirators. Over 78 percent of external CPT sales and over half of external CDT sales were made to customers who also purchased from at least one other co-

¹³³ In 2003, about 50 percent of the CRT TVs in the U.S. were imported. MTPD-0083663, at 3.

¹³⁴ The share of imports from China in 2002 and 2003 were about 12 percent and 18 percent, respectively. MTPD-0083663, at 5.

¹³⁵ Johnson Class Certification Report, par. 24.

¹³⁶ External sales include sales to customers other than CNEIECC (Chinese National Export & Import Caihong Company, which was the entity through which Irico exported its CRTs), Irico Display, and other Irico entities.

conspirator. Over 70 percent of external CPT sales were made to 11 customers who purchased from at least six other co-conspirators. These customers include Hisense, Thomson, Skyworth, TCL, Vestel, Panda Electronics, Sony, Haier Group, and Konka.

Figure 10
Irico's Share of External Sales to Customers
Who Purchased from Other Co-Conspirators
1995 - 2007

	Number of Irico Customers (1)	Irico Shipments (Units) (2)	Share of Irico Shipments (Percent) (3)
CPT			
10 Other Conspirators	1	108,789	0.1 %
9 Other Conspirators	1	8,290	0.0
8 Other Conspirators	4	592,465	0.5
7 Other Conspirators	2	31,314,228	29.0
6 Other Conspirators	9	45,321,824	41.9
5 Other Conspirators	2	83,184	0.1
4 Other Conspirators	4	822,980	0.8
3 Other Conspirators	14	2,978,252	2.8
2 Other Conspirators	19	1,437,413	1.3
1 Other Conspirator	22	2,665,895	2.5
At Least One Other Conspirator	78	85,333,320	78.9 %
CDT			
9 Other Conspirators	1	2,016	0.1
8 Other Conspirators	2	320,912	14.6
5 Other Conspirators	1	50,500	2.3
4 Other Conspirators	2	465,107	21.1
3 Other Conspirators	1	2,112	0.1
2 Other Conspirators	3	11,112	0.5
1 Other Conspirator	6	319,937	14.5
At Least One Other Conspirator	16	1,171,696	53.2 %

Notes: (1) Excludes internal sales.
 (2) Using parented customer names.

Source: CRT Manufacturers' Sales Data.

67. In sum, Irico participated in a global CRT market which included China, mainly produced CRTs targeted by the alleged conspiracy, and had overlapping customers with other alleged co-conspirators.

B. Irico Participated in Collusive Activities with Other Alleged Conspirators

68. As a CRT producer in a global CRT market, Irico had economic incentives to participate in the alleged collusion of the same nature as the other alleged conspirators. As an economic matter, there is nothing in Irico's circumstances that is substantially different from the rest of the CRT market to disincentivize its participation.
69. First, Irico's interests were aligned with other co-conspirators' interest to stabilize and elevate CRT prices. As part of the global CRT market, it would be subject to the same market forces that impacted the rest of the alleged conspirators. Documentary evidence, discussed below, show that Irico participated in collusive activities aiming to stabilize and elevate the CRT prices.
70. Second, Irico's size, relative to some of the larger conspirators, was neither an impediment nor a disincentive to Irico's participation in collusion. As I described in my Class Certification Report, gains from collusive activities accrue to both large and small firms.¹³⁷
71. Third, Irico's focus on CPTs was also neither an impediment nor a disincentive to participate in the collusion. The cartel targeted both CDTs and CPTs. As I discussed previously, while CDTs and CPTs have different applications, they are closely related products.¹³⁸
72. In my Class Certification Report, I discussed documentary evidence of Irico's participation in the alleged collusion. Specifically, I discussed evidence of Irico's participation in the various aspects of the alleged conspiracy, including price increases, output restraints, and exchange of information on prices, sales, and production.¹³⁹

¹³⁷ Johnson Class Certification Report, par 25.

¹³⁸ Johnson Class Certification Report, par 58; Johnson Class Certification Reply Report, 39-41.

¹³⁹ Johnson Class Certification Report, par. 38-42, 45, Appendix B.

73. Moreover, the documents in this case suggest that Irico was not merely an attendee in the meetings but an active participant. Along with other alleged conspirators, Irico aided in conspiracy's efforts by exchanging competitively sensitive information, as well as expressing agreement to price increases and output reductions. As described above, this kind of collusive activity is anticompetitive. The following are examples:¹⁴⁰

From a 1998 document: "IRICO: Meeting attendees designated the bottom price for 15" internal/external transactions IRICO as follows: (BASED ON S/S ITC TYPE). [] A) IRICO's internal transaction price for Caihung is (US\$60x10.4=RMB quote, tax included). B) For its other customers, because IRICO's quality and efficiency are poor and the volume is limited, it uses (US\$62 or \$63x10.4=RMB quote, tax included)." ¹⁴¹

Chunghwa meeting notes from 1999 stated: "Just contacted IRICO's Vice-President Wei by phone. [] I explained that we hoped that IRICO could cooperate with us to increase the 14" CPT sales price starting July 1st. IRICO basically agreed." ¹⁴²

Another Chunghwa meeting notes from 1999 states: "With major makers CPT, SDD and PH all determined to maintain prices, IRICO is both confident in and expresses support for the adjustment of prices for its major customers, Cai Hong Huang Qi and Weihai Daewoo Electronic Co." ¹⁴³

Chunghwa meeting notes from June 2000 states: "[Irico] [i]ndicated that it stopped production for 7 days in May to act in concert with the worldwide production stoppages. In addition, it will also stop production for 7 days in June due to the

¹⁴⁰ The examples below, as well as other documents, were discussed in Johnson Class Certification Report, par. 38-45, Appendix B.

¹⁴¹ CHU00030684E at 686.01E.

¹⁴² CHU00030769E at 769E.

¹⁴³ CHU00030777E at 779.01E.

reconstruction of screen *coating*. Will confirm before 6/14 regarding the *audit* time and personnel.”¹⁴⁴ (emphasis original)

Meeting notes from 2001 states that “*Irico* said that it has agreed with BMCC to keep the 14” ITC \$27 CIF as the basis for the lowest quoting price.”¹⁴⁵ (emphasis original)

During a meeting with several other co-conspirators in April 2001, in which production and inventory was discussed, Irico reported that “All [lines] stopped from April 28 to May 8. 25” DF has been stopped almost all the time and there are no plans to resume production. The 14” inventory increased explosively, so the plan to terminate production is being reviewed.”¹⁴⁶

To the question: “What is the opinion from respective makers regarding inventory increases, what is your view on Q1 2007?” Irico representative responded: “I would suggest to stop production during Chinese New Year holiday period, with a win/win situation for the company and the employees.” In the same meeting an Irico representative stated that it “[a]greed to limit production.”¹⁴⁷

¹⁴⁴ CHU00031018E at 018.02E.

¹⁴⁵ CHU00036384E at 384.02E.

¹⁴⁶ SDCRT-0087340E-42E at 41E.

¹⁴⁷ CHU00102752E at 753.03E, 754.02E. Other examples of Irico’s participation include: CHU00030745E (“At this meeting, because we spoke up strongly, the unreasonable domestic sales prices was seriously reviewed. 15” is the main point in the future, and everyone agreed to go back to the export base price of @USD 65 and a price calculation coefficient for domestic sales of 10.4. IRICO agreed to cooperate”), CHU00030819E (Irico present at meeting that set prices for 14”, 15” and 17” CDTs where they agreed “[a]ll the makers will finish sending notification of the above prices to customers next week,” and “[t]he next CDT meeting is projected to be convened on 9/02 by IRICO.”), SDCRT-0086672E (Irico attended a meeting where prices were set for 14”, 15”, and 17” CDTs for August and September, 1999), CHU00030665E (Irico raised prices for its main customer, Irico Royal, and Phillips agreed not to increase its supply to Irico Royal in exchange for Irico maintaining high prices for its CDTs. In addition, all attendees “resolved to increase the coefficient for domestic quotes from 10 to 10.4” [emphasis original]), CHU00030067E at 067.03E. (A Chunghwa document describes a visit to Irico in 2003, where they met with Irico’s Export Sales Chief.

C. The Alleged Conspiracy Elevated Irico's CRT Prices

74. Based on the evidence described above, I expect that the alleged conspiracy would have elevated Irico's CRT prices along with global CRT prices above competitive market levels. Irico's focus on domestic sales in China did not isolate it from the global market and CRT prices in the rest of the world.
75. I previously compared prices in China to prices in North America and the rest of the world and found that CRT prices in China tracked prices in North America and the rest of the world.¹⁴⁸
76. Below, using the new Irico Sales Data, I compare Irico's domestic prices to its export prices. Figure 11 and Figure 12 show average Irico prices for 14" and 21" CPT, both to domestic customers and for export. The figures show Irico's domestic prices (separately for internal and external transactions) compared to export prices.¹⁴⁹ Together, 14" and 21" CPT account for over 91 percent of Irico's exports. The figures show that Irico's domestic prices tracked Irico's export prices and domestic prices (excluding internal prices to other Irico entities) were at times higher than export prices.

During the meeting, Irico shared information about its production line and production capacity, as well as its sales and profits, and discussed product pricing.)

¹⁴⁸ Johnson Class Certification Report, par. 67.

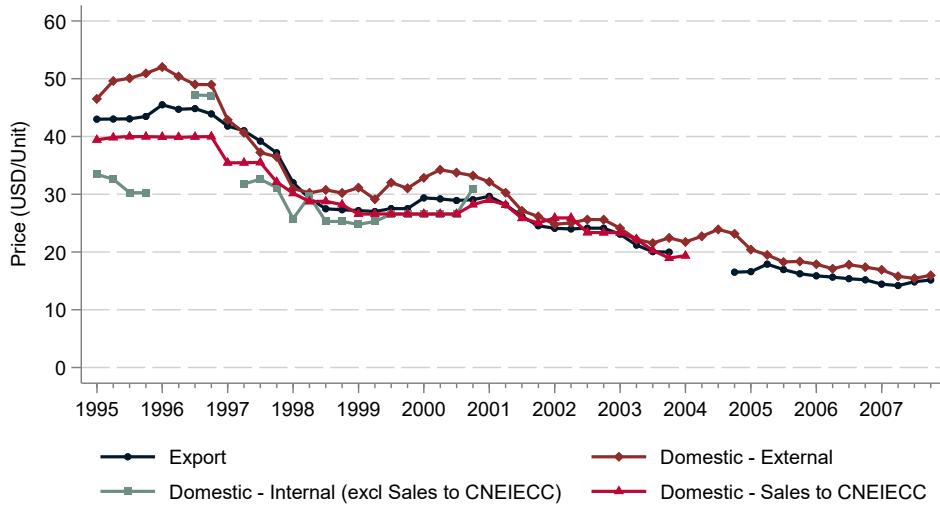
¹⁴⁹ Internal sales are broken down by sales to CNEIECC and other internal sales (e.g., sales to Irico Display). See Appendix B for the description of Irico's internal sales and entities.

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Figure 11

Irico's Quarterly Average CRT Prices
Export vs. Domestic
CPT 14-inch

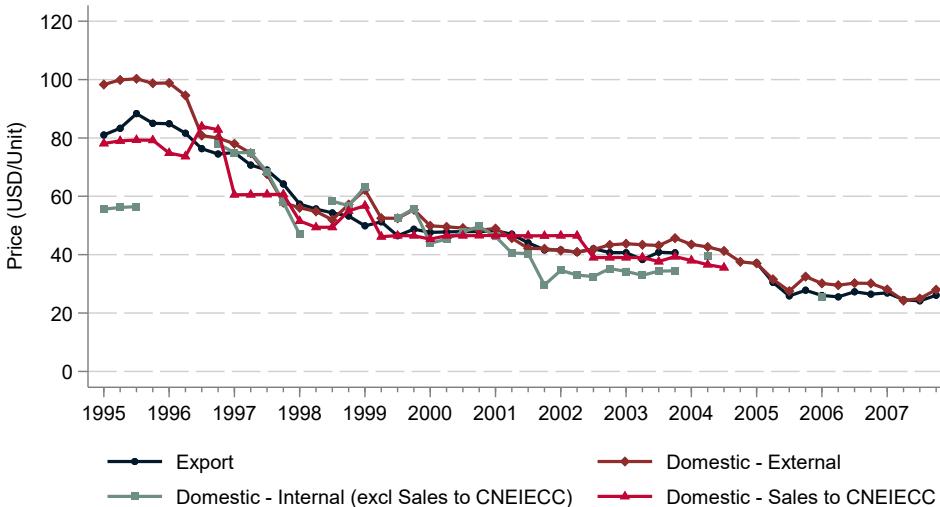


Note: Export includes CNEIECC and Xi'an Cairui sales and export invoices for Irico Display/Group/Electronics.
Domestic includes domestic invoices for Irico Display/Group/Electronics.

Source: CRT Manufacturers' Sales Data

Figure 12

Irico's Quarterly Average CRT Prices
Export vs. Domestic
CPT 21-inch

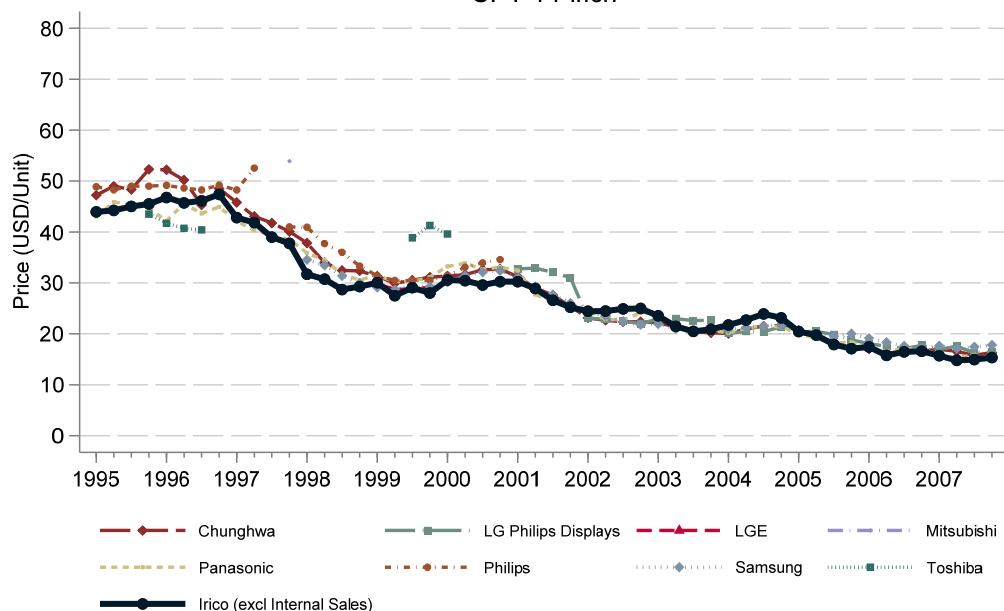


Note: Export includes CNEIECC and Xi'an Cairui sales and export invoices for Irico Display/Group/Electronics.
Domestic includes domestic invoices for Irico Display/Group/Electronics.

Source: CRT Manufacturers' Sales Data

77. Next, I compared Irico's CRT prices to prices charged by other alleged conspirators. Figure 13, Figure 14, and Figure 15 compare Irico's prices for its main CRT products (14", 21", and 25" CPTs respectively) to prices charged by other alleged conspirators. Irico's prices tracked closely with prices of the CPTs charged by its alleged co-conspirators.¹⁵⁰

Figure 13
Quarterly Average CRT Prices by Manufacturer
CPT 14-inch



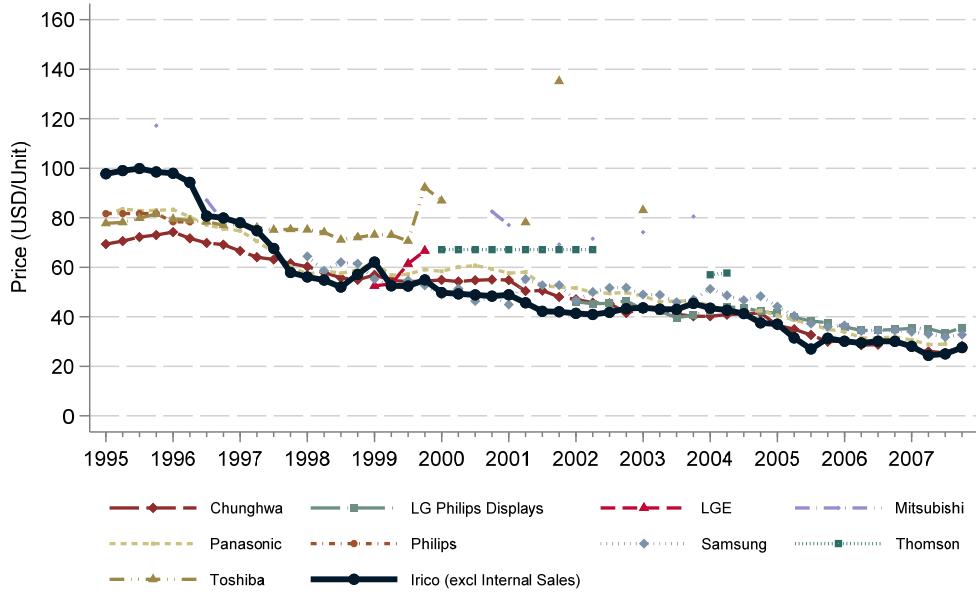
¹⁵⁰ These charts exclude Irico's internal sales. Charts including Irico's internal sales are included in Appendix A.

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Figure 14

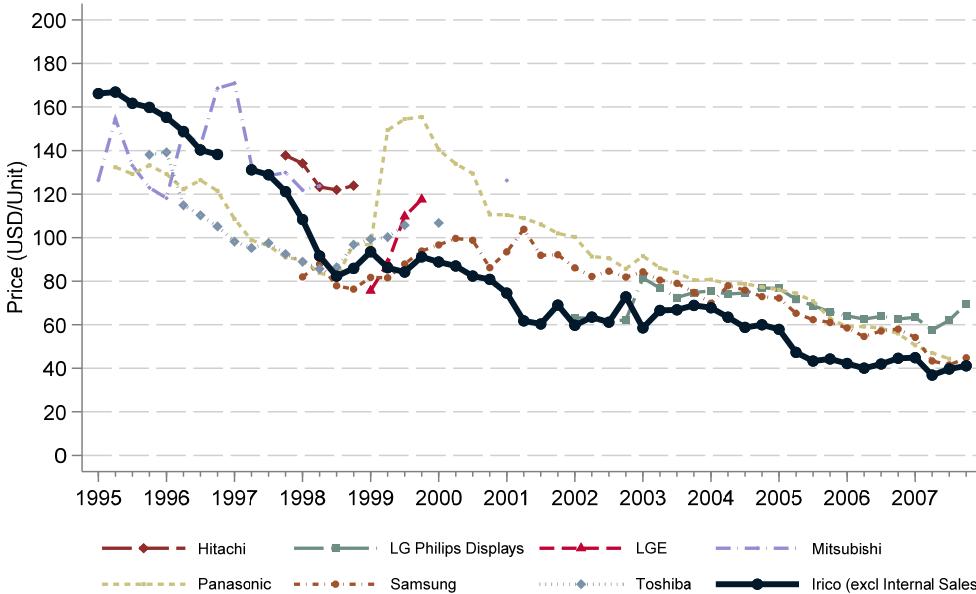
Quarterly Average CRT Prices by Manufacturer
CPT 21-inch



Source: CRT Manufacturers' Sales Data

Figure 15

Quarterly Average CRT Prices by Manufacturer
CPT 25-inch



Source: CRT Manufacturers' Sales Data

D. Documents Regarding Chinese CRT Regulations in 1999-2000 Are Not Inconsistent with Irico's Alleged Collusion

78. Irico has claimed that certain Chinese Government CRT regulations “prohibit[ed] both selling products below a producer’s actual costs [] and below ‘industrial average production costs’” and that these should be taken into account.¹⁵¹ I previously discussed the significance of information on Chinese government pricing regulations of CRT products.¹⁵² Two documents, apparently from the Chinese Ministry of Information, reference average industry production costs for certain CRT product in April 1999 and September 2000.

79. The Chinese Ministry of Information document from April 1999, reads:

In case where a manufacturer sells its products at the prices lower than the published industrial average production costs, causing market disorders and harming the interests of other manufacturers, a harmed enterprise may file a report []. If it is found through investigation that, such manufacturer indeed engaged in unfair price competition, a competent government department in charge of prices shall order such manufacturer to correct and impose penalties on it in light of the specific circumstance. [] Industrial Average Production Costs of Some Sizes and Types of Color CRTs and Color TVs [] 21” Color CRT RMB440/piece [] 25” Color CRT RMB720/piece.¹⁵³

80. The other document referenced by Irico contains a similar statement and references 21” (regular flat), 25” (regular flat), and 29” (ultra flat).¹⁵⁴ The relevant question for my analysis is whether these regulations may have somehow precluded Irico’s participation in the alleged cartel or had some effect on CRT overcharges that needs to be specifically accounted for in my overcharges model.

¹⁵¹ Irico Defendants’ Opposition to Direct Purchaser Plaintiffs’ Motion for Class Certification with Respect to the Irico Defendants, January 21, 2022, at 3, 22-24. (“Defendants’ Class Certification Opposition”)

¹⁵² Johnson Class Certification Reply Report, par. 50-53.

¹⁵³ IRI-CRT-00031457-468, at 459.

¹⁵⁴ Defendants’ Opposition, Exhibit F.

81. First, the purported existence of these regulations did not preclude Irico's participation in the alleged conspiracy. As I noted before, the regulations would, if anything, have facilitated the monitoring and enforcement of prices by the Chinese alleged conspirators.¹⁵⁵
82. Second, the supposed restriction on CRT pricing (even if effectively enforced), is not straightforward. It is unclear whether these regulations were (or could have been) effectively enforced. As an economic matter, individual manufacturers who were not colluding would be unlikely to share pricing data with other manufacturers. Hence, manufacturers would not necessarily possess the information that would be needed to report a violation (which, according to the statement quoted above, was apparently the only mechanism for detecting violations) and have it enforced. I understand that Dr. Henry Gao, an expert in Chinese law, has submitted a report in this case in which he opines that there is no evidence of the systemic enforcement of the regulations at issue (i.e., he found no evidence that it was actually enforced).¹⁵⁶
83. Finally, with respect to Class overcharges, these regulations have no bearing on the reliability of my overcharge model and the estimated Class overcharges. My overcharge model measures the conspiracy's impact on global prices and I have seen no indication that these regulations would have had any substantial effect on global prices.¹⁵⁷ Relative to global CRT sales during the Class Period, the scope of the regulations presented by Irico was limited to Chinese manufactured CRTs of two CPT sizes in 1999 and three CPT sizes in 2000.¹⁵⁸ It is implausible that they would have had any measurable effect on global CRT prices and overcharges.
84. Lastly, according to the document quoted above, sales of CRTs below published industry average production costs (if reported by competitors) would not necessarily result in penalties. A report by competitor would first initiate an investigation and

¹⁵⁵ Johnson Class Certification Reply Report, par. 53.

¹⁵⁶ Expert Report of Henry Gao, May 26, 2023, par. 7. ("Gao Report")

¹⁵⁷ Johnson Class Certification Reply Report, par. 51.

¹⁵⁸ Irico has not provided similar regulatory documents for other years. To the extent such existed it is not clear which, if any, CRTs were regulated. For example, another regulatory document provided by Irico related only to CRT TVs and not CRTs. Johnson Class Certification Reply Report, fn. 81.

only after concluding that the manufacturer was engaging in “unfair price competition” would the penalties be imposed. The regulations do not specify what would have constituted “unfair price competition.” Unfair price competition has been associated with a firm selling below *its own* average costs (not industry average costs) to gain market share.¹⁵⁹ I understand that Dr. Gao opines that the restrictions at issue were based on manufacturer’s own production costs.¹⁶⁰ Therefore, the effective “price floor” which could trigger penalties (notwithstanding the lack of evidence that it was enforced) was, apparently, the firms’ own average costs rather than the quoted industry average costs.

V. Class Damages from Elevated CRT Prices

A. Calculating Class Damages from CRT Purchases

85. To calculate Class damages on purchases of CRTs, I apply the overcharge percentages from my regression above to Class CRT purchases. I determine Class CRT purchases using the alleged conspirators’ sales data, as well as other industry data.

86. I understand that a Class purchase is defined as a purchase that was either billed to or shipped to the U.S. First, I use the alleged conspirators’ sales data to identify sales that were either billed to or shipped to U.S. based on the “billed-to” and “shipped-to” information provided in the data. In doing so, I treated sales with both non-U.S. bill-to and ship-to locations as non-Class sales. From each manufacturers’ data, I excluded internal sales to its subsidiaries, sales to other alleged conspirators, and sales to purchasers who have opted out of the Class.¹⁶¹ The remaining purchases in the sales data are missing either a bill-to or ship-to location.

¹⁵⁹ See, e.g., U.S. Department of Justice, Competition and Monopoly: Single-Firm Conduct Under Section 2 of the Sherman Act: Chapter 4 – Price Predation. (“There is broad consensus that, in certain circumstances, temporarily charging prices below *a firm’s costs* can harm competition and consumers.” (emphasis added))

¹⁶⁰ Gao Report, par. 7.

¹⁶¹ Opt-outs are provided in Exhibit A of Supplemental Declaration of Derek Smith re: Notice of Direct Purchaser Class Certification, March 17, 2023.

87. Figure 16 summarizes sales identified as billed to or shipped to U.S. and the sales lacking either bill-to or ship-to location information (after excluding internal sales, intra-conspirator sales, and sales to opt-outs). As the summary shows, the alleged conspirators' transactional CRT sales data typically did not contain both bill-to and ship-to country information.

Figure 16
Summary of Sales by Billed-to or Shipped-to Information
Based on Defendants' Transactional Data
CRT Tubes

Year	All Sales ¹		Billed-to or Shipped-to U.S. ²		Missing Either Billed-to or Shipped-to Information ³		Share of Sales Missing Either Billed-to or Shipped-to	
	CDT	CPT	CDT	CPT	CDT	CPT	CDT	CPT
	(Million Dollars)							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1995	\$ 1,838	\$ 1,162	\$ 76	\$ 109	\$ 1,761	\$ 788	95.8 %	67.8 %
1996	2,906	1,484	174	116	2,713	1,019	93.4	68.7
1997	2,553	1,323	60	126	2,491	890	97.6	67.3
1998	3,209	1,780	10	164	3,192	1,268	99.5	71.2
1999	3,128	2,246	12	188	3,103	1,720	99.2	76.6
2000	3,302	2,033	6	257	3,263	1,496	98.8	73.6
2001	2,253	1,766	5	252	2,230	1,204	99.0	68.2
2002	1,806	3,120	4	204	1,796	2,503	99.5	80.2
2003	1,057	2,483	1	111	1,053	1,957	99.7	78.8
2004	1,295	2,706	0	84	1,295	2,178	100.0	80.5
2005	820	2,083	0	11	818	1,812	99.8	87.0
2006	614	2,121	0	16	614	1,799	100.0	84.8
2007	247	1,441	1	12	247	1,231	99.7	85.4
Total	\$25,027	\$ 25,749	\$ 349	\$ 1,649	\$ 24,576	\$ 19,865	98.2 %	77.2 %

¹ All sales excluding sales to opt-outs, defendants and co-conspirators, regardless of location.

² Sales with U.S. specified for bill-to or ship-to countries.

³ Sales with unknown bill-to or ship-to countries, plus Iri^o sales with unknown shipped-to country.

Source: CRT Manufacturers' Sales Data.

88. Therefore, to calculate the value of U.S. sales for the portion of the data with missing information, I used the annual U.S. shares of global CDT and CPT sales from industry reports. These shares are presented in Figure 17 below. I applied these percentages to the annual sales amounts with missing billed-to or shipped-to country information in the conspirators' data to estimate the sales to Class Members.

Figure 17: U.S. Share of Global CRT Sales
Estimated Annual U.S. Share of Global CRT Sales

Year	N. America Share of Global Sales ¹		U.S. Share of N. America ² (Percent)	U.S. Share of Global Sales	
	CDT	CPT		CDT	CPT
	(1)	(2)	(3)	(4)	(5)
1995	1.8 % ³	11.2 % ⁴	85.2 %	1.5 %	9.5 %
1996	1.8 ³	11.2 ⁴	85.3	1.5	9.6
1997	1.8 ³	11.2 ⁴	84.9	1.5	9.5
1998	1.8 ³	11.2 ⁴	84.8	1.5	9.5
1999 ⁵	1.8 ³	11.2 ⁴	85.1	1.5	9.5
2000	1.9	10.9	85.1	1.6	9.3
2001	1.8	11.4	85.1	1.5	9.7
2002	1.7	11.2	85.0	1.4	9.5
2003	0.0	10.5	85.0	0.0	8.9
2004	0.0	12.0	85.1	0.0	10.2
2005	0.0	11.2 ⁴	84.9	0.0	9.5
2006	0.0 ⁶	11.2 ⁴	84.6	0.0	9.5
2007	0.0 ⁶	11.2 ⁴	84.3	0.0	9.4

Note: ¹ North America includes U.S., Canada, and Mexico. Shares are based on values in yen.

² Calculated using domestic demand by country for U.S., Canada and Mexico obtained from OECD, as U.S./(U.S.+Canada+Mexico).

³ The average of 2000-2002 is used as an estimate.

⁴ The average of 2000-2004 is used as an estimate.

⁵ Reported 1999 sales for CDT and CPT were implausible (i.e., exactly identical). The values for 1999 were therefore not used.

⁶ Share assumed to have remained at zero.

Source: Cols. (2)-(3): Fuji Chimera Institute, Flat Panel Display Applications: Trends and Forecasts, Editions 2000-2007.

Col. (4): OECD Annual Domestic Demand by Country
http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE1

89. Further, I understand that the alleged conspirators did not produce their complete sales records for the Class Period. In Figure 18, I list the sales data that I have identified as apparently missing, based on documents and publicly available information.¹⁶²

¹⁶² This figure summarizes time periods and product types for which sales data are missing entirely. In

90. I used industry sources to calculate the value of global CRT sales for each manufacturer for the periods with missing records.¹⁶³ I then adjusted these global sales for the U.S. share (using shares in Figure 17) and for sales to non-Class entities (i.e., eliminating internal sales, intra-conspirator sales, and sales to opt-outs) using the share of sales to those entities in the transactional data.¹⁶⁴ I estimate that the value of Class sales associated with this missing data is approximately \$104 million for CDT and \$1.1 billion for CPT.¹⁶⁵

addition, the sales data for other periods and products may also be incomplete. For example, Mitsubishi's transactional data contains around 11.9 million units of CDTs shipped between 1996 and 2000. However, industry data sources indicate that Mitsubishi shipped around 14.2 million units of CDTs during the same period (SDCRT-0201291).

¹⁶³ These sources are listed in the footnote to Figure 19. Industry sources such as SDCRT-0201291 contain global quarterly production units by manufacturer (and location), CRT type, and size but no sales figures. In order to derive annual dollar sales for co-conspirators with missing sales data, I calculated weighted average prices by CRT type, size (or size category as appropriate), and year using the transactional data and multiplied the units in the industry data by the calculated average prices. For industry sources in which units are not broken by size and/or manufacturer (e.g., HDP-CRT00019322), I used the transaction data to estimate annual shares by size and/or manufacturer for each product type to derive units by manufacturer, CRT type, and size.

¹⁶⁴ The shares of non-class entities are calculated annually as [Sales to Opt-Outs and Co-Conspirators] divided by [Global Sales] in CRT Manufacturers' Sales data. Sales to co-conspirators were identified by reviewing ship-to and bill-to customer names for co-conspirators and their affiliated entities. Details of this process are provided in the work materials.

¹⁶⁵ See backup materials to this report.

Figure 18**Summary of Missing Sales Data from Co-Conspirators
CRT Tubes**

Co-Conspirator (1)	Product Type (2)	Period (3)	Entities (4)	Supporting Documents (5)
Hitachi	CDT	All	Singapore & Malaysia Subsidiaries	MTPD-0416090.xls
Thomson	CPT	1995-1999 & 2005	All but TDA ¹	IBEW Journal Article
Samsung	CDT & CPT	1995-1997	All	March 8, 2012 letter from Samsung counsel; SDCRT-0201291.xls
Orion	CDT & CPT	All	All	MTPD-0416090.xls; SDCRT-0201291.xls (see OEC)
Thai-CRT	CDT & CPT	All	All	MTPD-0416090.xls; SDCRT-0201291.xls

Note: ¹ Technologies Displays Americas (formerly Thomson Displays Americas)

Source: CRT Manufacturers' Sales Data;
MTPD-0416090.xls;
SDCRT-0201291.xls;
March 8, 2012 letter from Samsung counsel;
IBEW Journal Article (<http://www.ibew.org/articles/04journal/0405/p11.htm>)

91. Figure 19 summarizes Class sales broken down by 1) those calculated using only conspirators' data (i.e., using produced data and known U.S billed-to or shipped-to transactions) and 2) sales estimated for transactions with missing billed-to or shipped-to location and missing sales data.
92. To compute Class damages for CRT purchases, I applied the annual average overcharge for each type of CRT (CDT or CPT) to the calculated Class sales for the respective CRT type. Figure 19 shows Class damages. The total estimated Class damages to CRT purchasers were \$346 million.

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Figure 19: Summary of CRT Overcharges

Summary of Class Sales and Damages CRT Tubes

Year	Class Sales								Damages									
	Conspirators Data ¹				Missing Data ²				Overcharge Percent		Conspirators Data ¹				Additional Estimated Missing Data ²			
	CDT	CPT	CDT	CPT	CDT	CPT	CDT	CPT	Total	CDT	CPT	Total	CDT	CPT	Total	Total		
(Million Dollars)																		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(Note 3)	(Note 3)	(8)+(9)	(Note 3)	(Note 3)	(11)	(12)	(11)+(12)	(10)+(13)	(14)
1995	\$ 76	\$ 109	\$ 48	\$ 238	9.9 %	5.6 %	\$ 7	\$ 6	\$ 13	\$ 4	\$ 13	\$ 17	\$ 17	\$ 30				
1996	174	116	69	323	11.1	6.3	17	7	24	7	19	26						50
1997	60	126	65	291	11.1	6.3	6	8	13	7	17	24						37
1998	10	164	56	244	11.1	6.3	1	10	11	6	15	20						31
1999	12	188	55	287	11.1	6.3	1	11	12	5	17	23						35
2000	6	257	62	159	11.1	6.3	1	15	16	6	9	16						32
2001	5	252	37	137	11.1	6.3	0	15	16	4	8	12						27
2002	4	204	27	262	11.1	6.3	0	12	13	3	16	18						31
2003	1	111	-	194	11.1	6.3	0	7	7	-	12	12						18
2004	0	84	-	250	11.1	6.3	0	5	5	-	15	15						20
2005	0	11	-	190	11.1	6.3	0	1	1	-	11	11						12
2006	0	16	-	254	8.7	7.4	0	1	1	-	17	17						19
2007	1	12	-	139	1.6	2.6	0	0	0	-	4	4						4
Total	<u>\$ 349</u>	<u>\$ 1,649</u>	<u>\$ 420</u>	<u>\$ 2,969</u>			<u>\$ 34</u>	<u>\$ 97</u>	<u>\$ 131</u>	<u>\$ 41</u>	<u>\$ 173</u>	<u>\$ 215</u>	<u>\$ 346</u>					

¹ Identified U.S. sales to class members from CRT Manufacturers' Sales Data² Estimated sales to class members either missing in CRT Manufacturers' Sales Data or identified as sales to Unknown locations.³ Calculated as [Class Sales]*[Overcharge Pct] / (1+[Overcharge Pct])

Sources: Cols. (2)-(3): CRT Manufacturers' Sales Data

Cols. (4)-(5): CRT Manufacturers' Sales Data; TDA's Revised Answers to Indirect-Purchaser Plaintiff's First Set of Interrogatories to Defendants; MTPD-0416090; SDCRT-0201291;

CHU00071226; CHU00154037-CHU00154420 at 154389-90; CHU00281352-CHU00281923 at 281644-45; CHWA00062147-CHWA00062569 at 62427;

CHWA00088192-CHWA00088762 at 88484; CHWA00106460-CHWA00106757 at 106730; PHP-CRT-001370; FOX00007278; HDP-CRT00019322

B. Calculating Class Damages from CRT Overcharges in CRT Finished Product Purchases

93. I understand that, for purposes of this case, the appropriate measure of damages on CRT finished product purchasers is the amount of the overcharge on the CRTs they contain.¹⁶⁶ In my Class Certification Report, I discussed and analyzed the relationship between CRT prices and CRT finished product prices.¹⁶⁷ I have updated this analysis using the new Irico Sales Data. There is no material change to the results of this analysis. Specifically, I estimated that a one percent increase in CRTs prices was associated, on average, with a 0.68 percent (compared to previous 0.71 percent) and

¹⁶⁶ Johnson Class Certification Report, par. 98.

¹⁶⁷ Johnson Class Certification Report, par. 89-97.

0.76 percent (compared to previous 0.78 percent) increase in the finished product price of CRT monitors and TVs, respectively.¹⁶⁸

94. I used finished product sales data produced by alleged conspirators to calculate Class sales and damages for direct CRT finished product purchasers. Using the same approach as described above for CRTs, I identify transactions billed-to, shipped-to, or sold-to the U.S. I exclude internal sales, sales made among alleged conspirators and their sales made to opt-outs.
95. Conspirators produced CRT finished product data for their subsidiaries that primarily (in some cases entirely) sold CRT finished products to the U.S. Figure 20 shows the summary of Class sales from conspirators' data identified as either billed-to, shipped-to, or sold-to U.S. and sales with missing information in any of billed-to, shipped-to, or sold-to data for each manufacturer. All (or nearly all) sales in Samsung, Hitachi, LGE, and Toshiba data were U.S. sales. In Tatung¹⁶⁹ and Philips¹⁷⁰ data, most of the sales were identified as either billed-to or shipped-to U.S., but around quarter of the data had either billed-to or shipped-to information missing. In Panasonic data, 58 percent of the data had either billed-to or shipped-to information missing.¹⁷¹ Mitsubishi and NMV (which was owned by Mitsubishi) data did not contain billed-to or shipped-to location information.

¹⁶⁸ Johnson Class Certification Report, par. 97. The updated analysis is provided in the backup materials to this report.

¹⁶⁹ Tatung provided data for Tatung Company of America, its U.S. subsidiary. See Letter from Paul H. McVoy to Rick Saveri re Tatung's data production, October 6, 2011.

¹⁷⁰ Philips' data production of CRT finished products consists mainly of sales data from its U.S. sales organizations. See Response to Questions Regarding Philips Data, October 22, 2013. See also Letter from Charles Malaise to Matthew D. Kent re Philips's responses to data questions, November 1, 2013.

¹⁷¹ Panasonic provided sales data of CRT finished products for its subsidiaries Panasonic North America (PNA), Panasonic Shikoku Electronics Corporation of America (PSECA), and Panasonic AVC Network Company America (PAVCA). See e.g., PNA-0000001 – PNA-0017751 PNA Finished Product Sales Data – HIGHLY CONFIDENTIAL, PNA-0027160 - Highly Confidential - PAVCA CRT Product Sales 1999 – JDE, and PNA-0027176 – Highly Confidential – PSECA – Sales.

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96. To estimate the share of sales in the U.S. for the sales with unknown billed-to / shipped-to information, I applied the share of U.S. CRT finished product exports using public sources (the annual shares ranged from 15 to 32 percent).¹⁷²

Figure 20: CRT Finished Product Sales to Class Entities by Destination

**Summary of Sales by Customer Location and Manufacturer in Class Period
Based on Defendants' Transactional Data
CRT Finished Products**

Manufacturer	All Sales ¹			Share of Total		
	U.S. ²	Non-U.S.	Unknown ³	U.S. ²	Non-U.S.	Unknown ³
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SAMSUNG	12,941	-	-	100.0 %	0.0 %	0.0 %
HITACHI	608	-	0	100.0	0.0	0.0
LGE	9,002	-	58	99.4	0.0	0.6
TOSHIBA	21,135	-	202	99.1	0.0	0.9
TATUNG	1,030	-	299	77.5	0.0	22.5
PHILIPS	23,492	10	9,159	71.9	0.0	28.0
PANASONIC	7,801	-	10,815	41.9	0.0	58.1
MITSUBISHI	-	-	0	0.0	0.0	100.0
NMV	-	-	4,796	0.0	0.0	100.0

¹ All sales excluding sales to opt-outs, defendants and co-conspirators, regardless of location.

² Sales with U.S. specified for bill-to, ship-to, or sold-to countries.

³ Sales with unknown bill-to, ship-to, or sold-to countries.

Source: CRT Finished Product Manufacturers' Sales Data.

97. Additionally, as with the CRT sales data, I understand that some of the alleged conspirators' data is missing sales records during the Class Period. In Figure 21, I summarized the data I have identified as apparently missing. Using industry data on U.S. shipments, and global market shares of each manufacturer, I estimated the U.S. sales associated with this missing data.¹⁷³ Additionally, I made an adjustment for sales

¹⁷² The shares of U.S. exports of televisions of all types were calculated based on U.S. production of color TVs (NAICS Codes 36512 and 3343102) and U.S. exports of color TVs (HTS Codes 8528.10, 8528.12, and 8528.72) obtained from U.S. Census Bureau and U.S. Internal Commission, respectively. U.S. Census Annual Survey of Manufacturers, 1996, 2001, 2005 and U.S. ITC (<https://dataweb.usitc.gov/>).

¹⁷³ Because only yearly unit shipments of all monitors and TVs are available in the industry data, I use weighted average prices by CRT type and year in the transactional sales data to calculate the annual dollar

to non-Class entities (i.e., eliminating internal sales, sales to other conspirators and opt-outs), using the share of sales to those entities in the conspirators' data. I estimated that value of Class sales associated with this missing data is \$4.36 billion for CRT monitors and \$5.67 billion for CRT TVs.

Figure 21: Missing CRT Finished Product Sales Data

**Summary of Missing Sales Data from Co-Conspirators
CRT Finished Products**

Co-Conspirator (1)	Product Type (2)	Period (3)	Entities (4)	Supporting Documents (5)
Hitachi	Monitor	All	All	Hitachi News Release
Samsung	Monitor and TV	1995-1997	All	March 8, 2012 letter from Samsung counsel
Mitsubishi	Monitor	1995-1998	Mitsubishi	ME00096242
Orion	TV	All	All	DISP_LCD_000129.xlsx
Thomson	TV	All	All but TDA ¹	DISP_LCD_000129.xlsx (see TCL)

Note: ¹ Technologies Displays Americas (formerly Thomson Displays Americas)

Source: CRT Finished Product Manufacturers' Sales Data;
March 8, 2012 letter from Samsung counsel;
DISP_LCD_000129.xlsx;
Hitachi website (<http://www.hitachi.com/New/cnews/E/2001/0726b/0726.pdf>);
ME00096242

98. Figure 22 shows a summary of CRT finished product Class sales broken down by 1) those calculated using only conspirators' data (i.e., using produced data and known U.S billed-to or shipped-to transactions) and 2) sales estimated for transactions with missing billed-to or shipped-to location and missing sales data.
99. To calculate Class damages for CRT finished products, I first computed the average annual per-unit dollar overcharge for each CRT type by applying the estimated by-type overcharge percentages to the average price for each CRT type. I then multiplied this per-unit overcharge by the corresponding units of CRT finished product sales to the Class. Figure 22 shows the summary of estimated Class sales and overcharges by year and product type. The estimated total Class overcharges for CRT finished products is \$739 million.

sales.

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Figure 22: Summary of CRT Finished Product Overcharges

Summary of Class Sales and Damages
CRT Finished Products

Year	Class Sales								Damages									
	Conspirators Data ¹		Missing Data ²		Average Per-Unit CRT Overcharge ³		Conspirators Data ¹			Additional Estimated Missing Data ²			Damages					
	Monitor	TV	Monitor	TV	CDT	CPT	Monitor	TV	Total	Monitor	TV	Total	TV	Total	Total	Total	Total	
	(Thousand Units)				(Dollars)			(Million Dollars)			(Million Dollars)			(Million Dollars)				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	
1995	68	2,471	4,671	4,326	\$ 9	\$ 4	\$ 1	\$ 9	\$ 10	\$ 40	\$ 16	\$ 57	\$ 67					
1996	458	3,216	5,145	5,039	12	6	6	19	24	63	29	92	117					
1997	654	3,375	5,206	4,076	12	6	8	21	29	62	25	87	116					
1998	2,713	3,660	2,080	3,788	9	5	25	17	42	19	18	37	79					
1999	2,422	5,987	171	4,182	9	5	22	29	50	2	20	22	72					
2000	1,834	7,234	800	2,978	9	5	16	36	52	7	15	22	73					
2001	1,473	7,836	1,249	1,621	7	5	10	38	48	9	8	16	64					
2002	1,138	7,374	783	1,724	6	4	6	30	37	4	7	11	48					
2003	666	7,552	494	1,883	5	4	3	28	31	2	7	9	41					
2004	1,329	6,480	325	1,228	5	3	6	22	29	1	4	6	34					
2005	441	5,117	124	1,572	4	3	2	14	16	0	4	5	20					
2006	144	1,916	56	245	3	3	0	5	6	0	1	1	7					
2007	12	436	20	157	1	1	0	0	0	0	0	0	1					
Total	13,353	62,656	21,123	32,819			\$ 104	\$ 270	\$ 373	\$ 210	\$ 155	\$ 365	\$ 739					

¹ Identified U.S. sales to class members from CRT Finished Product Manufacturers' Sales Data

² Estimated sales to class members either missing in CRT Finished Product Manufacturers' Sales Data or identified as sales to Unknown locations.

³ Average per-unit CRT overcharge weighted by quantity of CRT sold.

Sources: Cols. (2)-(3): CRT Finished Product Manufacturers' Sales Data
Cols. (4)-(5): CRT Finished Product Manufacturers' Sales Data; Mitsubishi (MEVSA)'s Third Supplemental Response to DPP Crago's First set of Interrogatories (and Bates-numbered documents referenced within); Oregon Department of Environmental Quality, Product Profile: CRTs, March 2001; Fuji Chimera Institute, Flat Panel Display Applications: Trends and Forecasts, Editions 2000-2001; DISP_LCD_000129; ME00096242; U.S. Census Bureau, Annual Survey of Manufacturers, 1996, 2001, 2005 for U.S. production of color TVs; U.S. International Trade Commission (<https://dataweb.usitc.gov/>) for U.S. exports of color TVs.

100. Summing overcharges on Class CRT purchases and Class CRT finished product purchases, the total Class damages is \$1.085 billion.¹⁷⁴

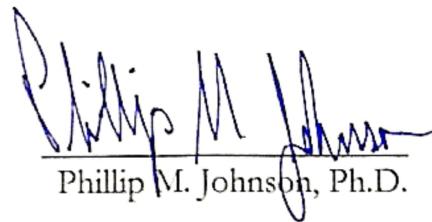
¹⁷⁴ Sum of total CRT damages (\$346 million) and total CRT finished product damages (\$739 million). In the backup materials to this report, I calculate class sales and damages based on sales of each alleged conspirator.

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Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed on: May 26, 2023



Phillip M. Johnson, Ph.D.

APPENDIX A. Additional Figures

Figure 23: CPT 14 Including Irico's Internal Sales

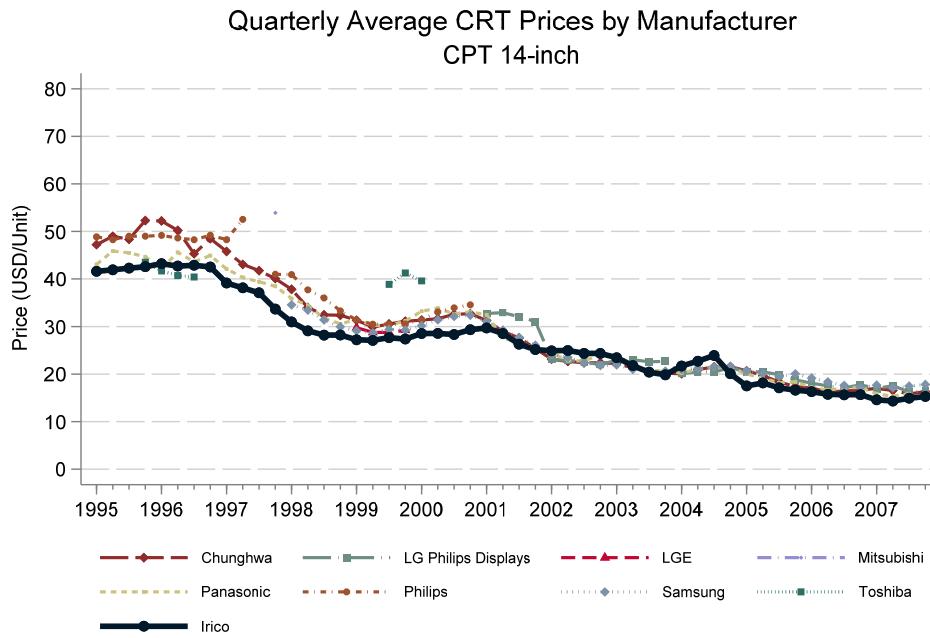


Figure 24: CPT 21 Including Irico's Internal Sales

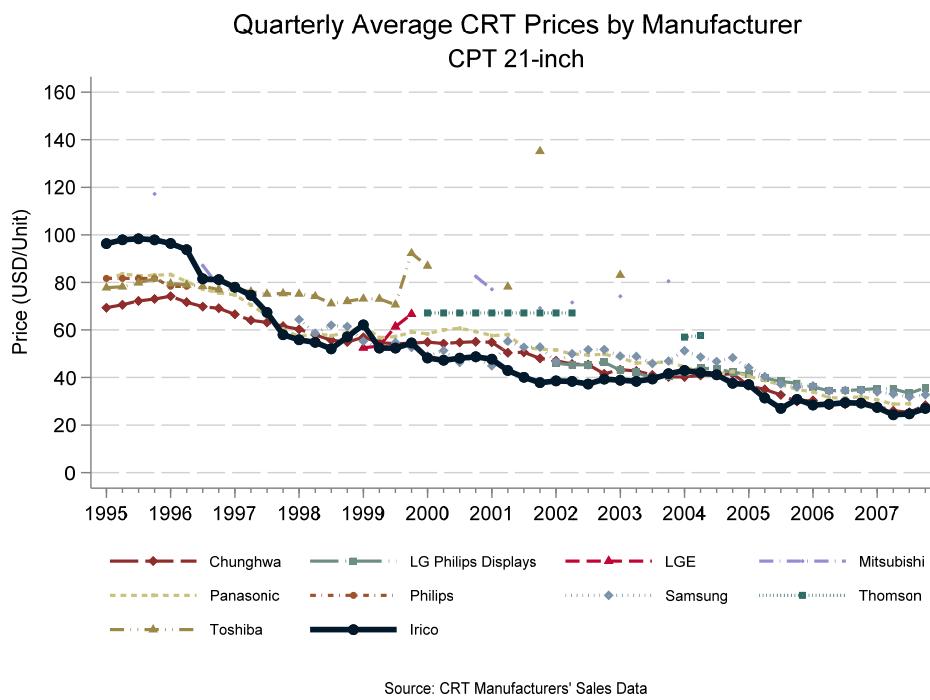
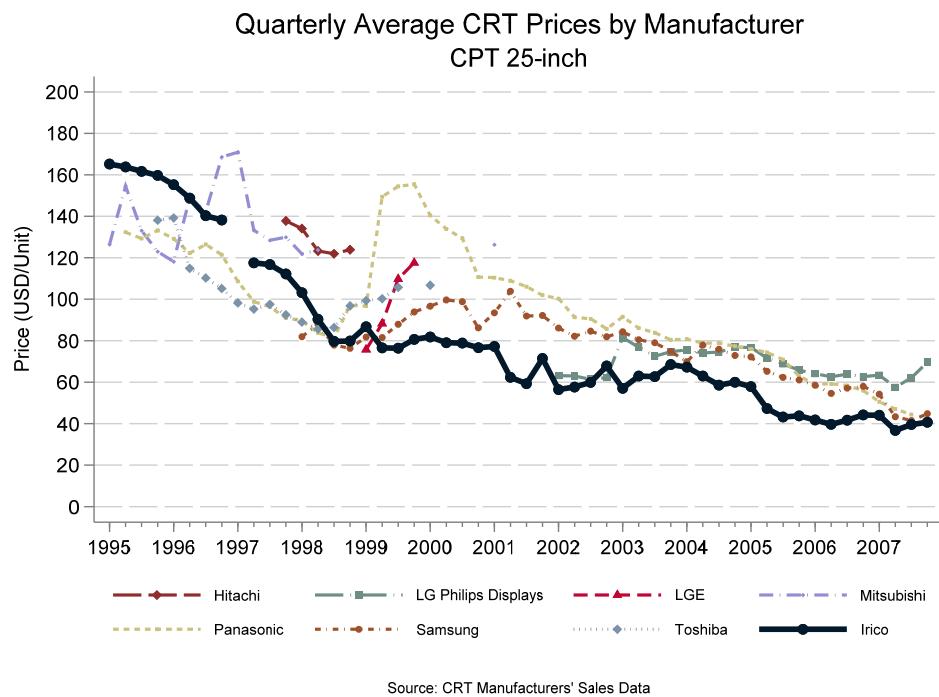


Figure 25: CPT 25 Including Irico's Internal Sales

APPENDIX B. Irico Sales Data

101. Irico produced transactional sales data for CRTs from 1995 to 2007 (and insignificant amount in 1994). According to Irico, these transactions were collected by Irico from original hard copy invoices and entered into a dataset.¹⁷⁵ According to Irico, these documents are “the only complete and accurate repository reflecting Irico’s CRT sales during the relevant period,” and “Irico has no electronic records of CRT sales that it believes to be complete or accurate.”¹⁷⁶
102. Transactions in Irico Sales Data contain sales entity (described below), a product description, sales quantity, sales amount,¹⁷⁷ customer name, invoice number, voucher number, voucher month and year, and whether the sale was domestic or an export. According to Irico, a voucher is a summary page for internal accounting purposes prepared by Irico’s accounting department after a sales transaction and the date on a voucher represents the date that Irico’s accounting department entered each transaction into its accounting books.¹⁷⁸ Only a portion of the sales transactions contain a product model number.
103. I have requested and received scans of a sample of 100 invoices from Irico Sales Data records.¹⁷⁹ Under my direction, my staff cross-checked the contents of these invoices with the records in the data. Based on my and my staff’s review of these sample invoices, I found that the data produced by Irico was generally consistent with the content of the invoices, and the produced data was suitable for use in my analysis.¹⁸⁰

¹⁷⁵ Werbel Letter re Invoice Summary, August 6, 2021.

¹⁷⁶ Werbel Letter re Invoice Summary, August 6, 2021.

¹⁷⁷ For export sales, amounts were produced in U.S. dollars (USD). For domestic sales, amounts were produced in yuan (RMB). Two sales amount fields were produced: “Net Revenue (RMB)” and “Tax-included (RMB)” with sales amounts that include taxes (in RMB).

¹⁷⁸ According to Irico, every Irico transaction is recorded by a “fa piao (for domestic sales) or an invoice (for international sales). [...] a fa piao is a legal receipt that serves as a proof of purchase in China. A voucher is a summary page for internal accounting purposes. It is prepared by Irico’s accounting department after the transaction.” Werbel Letter to Rushing Capurro re Sample Irico Invoices, September 14, 2021.

¹⁷⁹ Irico’s sales data includes over 25,700 unique invoice/receipts.

¹⁸⁰ Based on this review, one product description entry and one export destination country entry were

104. Invoice dates were provided only for Xi'an Cairui and CNEIECC (China National Electronics Import & Export Caihong Co.) entity transactions, while only voucher year and month was provided for the remaining transactions. I compared the length of time between invoice date and voucher date, for transactions where both were available. For approximately 90% of those transactions voucher date was within 30 days of the invoice date.¹⁸¹ As a result, in the absence of complete invoice date in the data, I use voucher month and year for all data for consistency.
105. Irico Sales Data included a product description field using which I identified the product type (CDT or CPT), product size, flatness (partially), and whether the CRT is sold with a deflection yoke (ITC) or not (bare).¹⁸² The data also included fields for export destination¹⁸³ and customer names¹⁸⁴.
106. I have examined the data for potentially erroneous entries of revenues and quantities sold. The data contained some transactions showing extreme prices relative to the prices of other similar products (same type and size). I removed these transactions with extreme prices from my analysis data.¹⁸⁵

corrected in the data. Several other errors involved incorrect data entry of the invoice/receipt, voucher number fields, and city (but not country) of export.

¹⁸¹ I was also able to determine invoice dates for a sample of 70 invoices from Irico Group, Irico Display and Irico Electronics provided by Irico. In this sample, for over 90% of transactions voucher date was within 30 days of the invoice date.

¹⁸² I was able to identify product type for all products, with the exception of certain products which accounted for only 0.1% of sales. I was able to identify size for all products, with the exception of certain products which accounted for only 0.5% of sales. ITC or bare is identified for all products based on the information provided by Irico. Flatness was identified in approximately 30% of products, but Irico's data and information was not sufficient to determine whether the remaining products were flat or curved. See Werbel Letter to Saveri Capurro re Irico Sales Summary Questions, May 11, 2023.

¹⁸³ Export destination is available for over 90% of exported sales.

¹⁸⁴ Many customer names required translation. Transactions whose customer names were not translated represent less than 1% of Irico's total sales throughout the class period.

¹⁸⁵ Specifically, I excluded transactions of 15-inch CDT if calculated price exceeded \$100 and transactions of 21-, 25-, and 29-inch CPTs if calculated price exceeded \$200. The excluded transactions represent 0.2 percent of all sales in the data.

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107. Irico provided sales data for five entities named Irico Group, Irico Electronics, Irico Display, Xi'an Cairui, and CNEIECC. I understand that these entities represent Irico Group Corp., Irico Group Electronics Company Ltd., Irico Display Devices Co., Ltd., Xian Irico Display Technology Co., Ltd., and China National Electronics Import & Export Caihong Co., respectively.¹⁸⁶ I understand Irico Group Corp. (“Irico Group”) was the parent company of Irico Display Devices (“Irico Display”) until the formation of Irico Group Electronics (“Irico Electronics”) in September 2004. Irico Group retained a controlling ownership in Irico Electronics, and Irico Display became a subsidiary of Irico Electronics in the transition.¹⁸⁷ According to Irico, Irico Group exported CRTs exclusively through CNEIECC until the formation of Irico Electronics in 2004. After its formation, Irico Electronics (and its subsidiary Irico Display) took over handling of both domestic and export sales of CRTs. Xian Irico Display Technology (or “Xi'an Cairui”), established in 2004, also exported CRTs.¹⁸⁸
108. Figure 26 below shows a summary of annual sales by Irico entity based on the sales data provided by Irico. All sales by Xi'an Cairui and CNEIECC are identified as export invoices in the sales data by Irico.¹⁸⁹
109. Figure 27 shows the breakdown of annual sales by four categories: domestic sales to CNEIECC, domestic sales to other internal entities (e.g., sales from Irico Group to Xi'an Irico Electronics Industrial Co, sales from Irico Display to Irico Display, etc.),¹⁹⁰ domestic sales to external customers, and export sales. Export sales consist of sales by CNEIECC until 2004 and Xian Cairui and Irico Electronics after 2005. Figure 27 also shows a sharp decrease in annual total revenues from 2003 to 2004,

¹⁸⁶ Letter from Joseph R. Tiffany II, January 15, 2009, “Response of Irico Group Corporation and Irico Display Devices Co., Ltd. To Plaintiffs’ Information Requests” at 1.

¹⁸⁷ Irico Group Electronics 2004 Annual Report at 2, 80.

¹⁸⁸ Letter from Joseph R. Tiffany II, January 15, 2009, “Response of Irico Group Corporation and Irico Display Devices Co., Ltd. To Plaintiffs’ Information Requests” at 1.

¹⁸⁹ See backup materials to this report.

¹⁹⁰ Irico’s sales data contain sales to Irico entities as customer. Some invoices from Irico Display show Irico Display as a customer.

the timing of which coincides with the 2004 formation of Irico Electronics described earlier. The decrease appears to be attributed to the near disappearance of internal domestic sales to Irico entities (other than CNEIECC) after 2003 in connection with the transition.

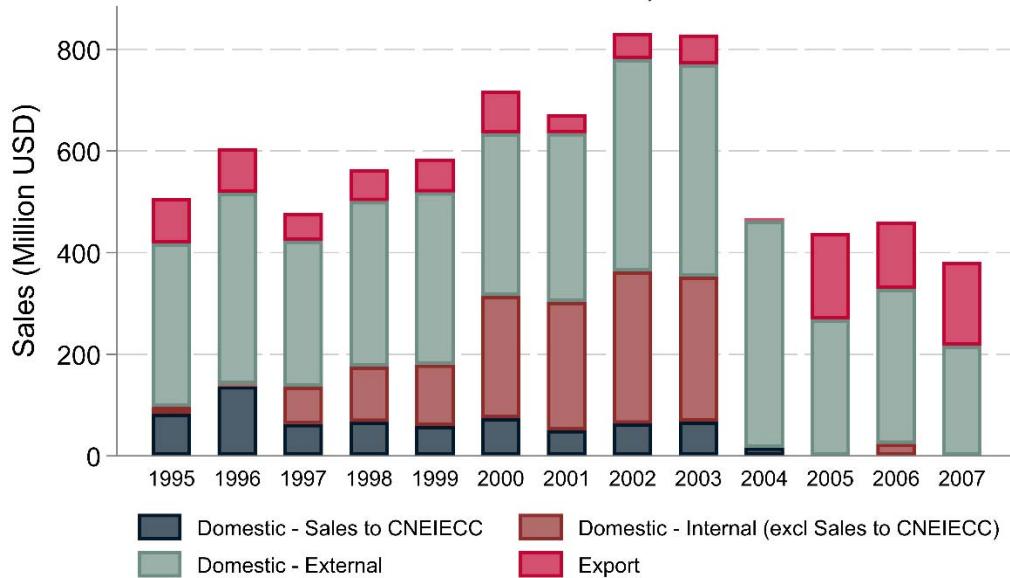
110. Annual shipments by CRT product type and size for all Irico entities combined are presented in Figure 28.

Figure 26

Summary of Irico Sales by Entity and Year
CRT Tubes

Year	Units Sold					Revenues				
	Irico Display	Irico Electronics	Irico Group	Xian Cairui	CNEIECC	Irico Display	Irico Electronics	Irico Group	Xian Cairui	CNEIECC
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1994	-	-	-	-	133	\$ -	\$ -	\$ -	\$ -	\$ 5,562
1995	642	-	4,982	-	2,022	\$ 88,653	-	\$ 329,112	-	\$ 88,989
1996	1,094	-	5,685	-	1,884	\$ 146,632	-	\$ 371,384	-	\$ 86,838
1997	1,337	-	5,040	-	1,336	\$ 149,781	-	\$ 274,054	-	\$ 54,261
1998	2,609	-	6,376	-	2,086	\$ 216,389	-	\$ 285,028	-	\$ 62,594
1999	2,723	-	7,205	-	2,008	\$ 216,898	-	\$ 309,671	-	\$ 58,723
2000	7,486	-	5,279	-	2,150	\$ 456,718	-	\$ 191,973	-	\$ 69,575
2001	9,780	-	2,692	-	1,295	\$ 548,950	-	\$ 86,295	-	\$ 36,847
2002	12,860	-	4,138	-	1,955	\$ 674,071	-	\$ 107,059	-	\$ 51,431
2003	12,507	-	4,922	-	2,562	\$ 632,511	-	\$ 137,735	-	\$ 59,008
2004	7,196	834	2,382	-	310	\$ 351,261	\$ 23,414	\$ 88,041	-	\$ 5,112
2005	5,134	7,935	-	2,755	227	\$ 191,360	\$ 184,303	-	\$ 59,520	\$ 3,965
2006	8,347	8,190	-	5	-	\$ 271,067	\$ 189,730	-	\$ 81	-
2007	7,030	7,236	-	1,006	-	\$ 203,754	\$ 157,734	-	\$ 20,216	-
Total	78,746	24,194	48,702	3,766	17,967	\$ 4,148,043	\$ 555,181	\$ 2,180,353	\$ 79,816	\$ 582,903

Source: CRT Manufacturers' Sales Data.

Figure 27Irico's Annual Sales of CRTs Contained in Irico Sales Data
Domestic vs. Export

Note: Export includes CNEIECC and Xi'an Cairui sales and export invoices for Irico Display/Group/Electronics.
Domestic includes domestic invoices for Irico Display/Group/Electronics.

Source: CRT Manufacturers' Sales Data

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Figure 28

Summary of Irico Sales by Type, Size, and Year
CRT Tubes

Product Type	Size	Annual Units Sold													
		1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
(Thousand Units)															
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(16)
CDT	14		5	40	40	75									6
CDT	15					310	857	824	511	379	63	0	52		
CDT	16								10						
CDT	(Unknown)			256	296	40	385	857	824	521	379	63	0	52	6
Total CDT		-	5	296	40	385	857	824	521	379	63	0	52	6	-
CPT	14	133	4,451	4,155	3,288	4,469	5,138	5,534	3,310	5,422	6,056	1,872	6,632	4,127	3,224
CPT	15										91	99	1,070	617	545
CPT	16														41
CPT	17														3
CPT	18		1,047	498	141	15	66	33	51	41	7	0			1
CPT	19						0								
CPT	20						0								23
CPT	21		1,418	2,507	2,907	3,577	3,151	5,348	6,294	7,647	8,683	5,848	5,975	8,636	9,314
CPT	22		214	150	85	74	0	0		2			14		1
CPT	23									2					
CPT	24									1					
CPT	25		421	913	1,252	2,534	2,723	3,168	2,967	4,643	4,502	2,837	2,243	2,994	1,447
CPT	26												36		
CPT	29						17	0	1	623	800	589	64	26	278
CPT	(Unknown)			102	0	1	6		16	18,575	19,928	10,722	16,000	16,535	463
Total CPT		133	7,551	8,325	7,673	10,687	11,079	14,091	13,246	18,575	19,928	10,722	16,000	16,535	15,272
(Unknown)	14		90	41											
Total (Unknown)		-	90	41	-	-	-	-	-	-	-	-	-	-	-
Grand Total		133	7,646	8,663	7,713	11,071	11,936	14,915	13,767	18,953	19,991	10,722	16,052	16,541	15,272

Source: CRT Manufacturers' Sales Data.

EXHIBIT 1

**Phillip Johnson, Ph.D.**

Managing Director
 854 Diablo Road
 Danville, California 94526
 Email: pjohnson@econone.com
 Tel: 925 282 6003

Curriculum Vitae**EDUCATION**

PhD, University of California, Los Angeles, Economics, 1997
 MA, University of California, Los Angeles, Economics, 1993
 BA, California State University Northridge, Economics, 1991

PROFESSIONAL EXPERIENCE*Econ One Research, Inc.*

Managing Director, 2012 – Present
 Senior Economist, 2009 – 2012
 Economist, 2000 – 2009

Instituto Tecnológico Autónomo de México (ITAM),
 Assistant Professor, 1997-2000**AREAS OF ECONOMIC EXPERTISE**

Analysis of markets and antitrust issues
 Damages calculation and estimation
 Econometric and statistical analysis
 Impact issues in class actions
 Intellectual property damages and reasonable royalties

AWARDS

Jerry S. Cohen Memorial Fund Writing Award, for “Statistical Significance and Statistical Error in Antitrust Analysis,” <https://www.antitrustinstitute.org/awards>, June 21, 2018

PUBLICATIONS AND RESEARCH

“Testing for Bid Rigging in California Highway Construction Procurement,” 2020, with Nedko Yordanov and Alexander Berry
 “Roundtable with Economists,” Antitrust, Spring 2018, with Dennis Carlton, Gregory Leonard, Maria Maher, and Carl Shapiro

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“Statistical Significance and Statistical Error in Antitrust Analysis,” Antitrust Law Journal, Vol. 81, 2017, with Edward Leamer and Jeffrey Leitzinger

“Increasing Focus on Information Exchanges Among Competitors,” Law360, April 2017, with Niyati Ahuja

“Regression Techniques for Estimating Overcharges Using Market Concentration Data,” American Bar Association, Section of Antitrust Law, Economics Committee Newsletter, Volume 12, Number 1, Summer 2012, with Armen Markosyan

“Reasonable Royalty Damages and License Structure,” Econ One Newsletter, Spring 2007

“A Surprising Result from Patent Infringement: Price Accretion Instead of Price Erosion,” Econ One Newsletter, Spring 2005

“Lost Profits Damages When Infringement Raises the Patentee’s Prices,” American Bar Association, Section of Intellectual Property Law, Newsletter, Volume 23, Number 1, Fall 2004, with Tessie Su

“Patent Damages and Price Erosion”, Econ One Newsletter, Fall 2003

“Evolution and Information in a Gift-Giving Game,” Journal of Economic Theory, Volume 100, 2001, with David Levine and Wolfgang Pesendorfer

“Mergers, Alliance and Welfare in Differentiated Markets with Quality-Improving Innovations in Markets with Complementary Goods,” with Tessie Su and Tridib Sharma

“Evolution and Information in a Prisoners’ Dilemma,” with David Levine and Wolfgang Pesendorfer

“The Stability of Monetary Institutions as a Social Institution”

PRESENTATIONS

Emerging Trends in Antitrust Enforcement, The Knowledge Group, May 2022

Economic Perspectives on Damages: What You Must Know, The Knowledge Group, October 2019

Antitrust Class Certification: Recent Trends and Developments, The Knowledge Group, August 2019

Statistical Issues with Regression Analysis for Antitrust Litigation, Kaplan Fox, 2015

West LegalEdCenter Patent Disputes Conference, 2013

Deposing the Expert Witness, NITA, 2012

Cross Examining Expert Witnesses, Annual Meeting of the California State Bar, 2012

West LegalEdCenter Patent Disputes Conference, 2011

Deposing the Expert Witness, NITA, 2011

Cross Examining Expert Witnesses, Trial Advocacy Group, 2011

Patent Damages Webinar, Law.com, 2010

Cross Examining Expert Witnesses, Trial Advocacy Group, 2009

Deposing the Expert Witness, NITA, 2008

Latin American Meetings of the Econometric Society, 1999

Stony Brook Summer Festival on Game Theory, 1999

University of California at Los Angeles, 1999

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Allied Social Sciences Association, 1998
 Academica Sinica, Taiwan, 1997
 National Taiwan University, 1997
 Instituto Tecnológico Autónomo de México, 1997
 Stony Brook Summer Festival on Game Theory, 1996

SUMMARY OF DISCLOSED ENGAGEMENTS

Clippinger et al. v. State Farm Mutual Automobile Insurance Company. Retained to analyze claims that State Farm's "typical negotiation adjustments" breached its contract obligations to a class of Tennessee insureds who experienced a total vehicle loss. Expert report and deposition testimony. 2023 – Present.

Wiggins et al. v. State Farm Mutual Automobile Insurance Company. Retained to analyze claims that State Farm's "typical negotiation adjustments" breached its contract obligations to a class of South Carolina insureds who experienced a total vehicle loss. Expert reports and deposition testimony. 2023 – Present.

Chadwick et al. v. State Farm Mutual Automobile Insurance Company. Retained to analyze claims that State Farm's "typical negotiation adjustments" breached its contract obligations to a class of Arkansas insureds who experienced a total vehicle loss. Expert reports and deposition testimony. 2022 – Present.

Palmer et al. v. Cognizant Technology Solutions. Retained to analyze disparities in the employment, promotion, and termination of South Asian and non-South Asians by Cognizant. Expert reports and deposition testimony. Class certified October 2022. 2022 – Present.

In Re Keurig Green Mountain Single Serve Coffee Antitrust. Retained to analyze impact and damages to BJ's arising from alleged anticompetitive conduct by Keurig. Expert reports and deposition testimony. 2022 – Present.

Robinson et al. v. Jackson Hewitt, Inc. and Tax Services of America, Inc. Retained to analyze class-wide impact and damages arising from alleged collusive no-poach agreements between Defendants and Defendants' franchisees. Expert reports and deposition testimony. 2020 – Present.

In Re: CRT Antitrust Litigation (Irico). Retained to analyze economic issues relating to class certification, liability, and damages for a case in which a class of direct purchasers of cathode ray tubes alleged price-fixing by the major CRT manufacturers. Expert reports and deposition testimony. Class certified August 2022. 2021 – present.

Hunter et al. v. Booz Allen Hamilton, Mission Essential, and CACI. Retained to analyze class-wide impact and damages arising from alleged collusive no-poach agreement between Defendants. Expert reports and testimony, both in deposition and in a class certification hearing. Settled. 2020 – 2022.

In Re Keurig Green Mountain Single Serve Coffee Antitrust. Retained to analyze impact and damages to The McLane Company arising from alleged anticompetitive conduct by Keurig. Expert reports and deposition testimony. 2020 – Present.

Alchem v. Terianne Cage and North American Nicotine. Retained to analyze damages arising from an alleged theft of trade secrets. Expert report. Summary judgement in favor of Defendant. 2021.

In Re Keurig Green Mountain Single Serve Coffee Antitrust. Retained to analyze impact and damages to indirect purchasers arising from alleged anticompetitive conduct by Keurig. Settled 2020.

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In Re Rail Suppliers Antitrust. Retained to analyze data and issues relating to common impact and damages from an alleged no-poach agreement between manufacturers of rail equipment. Settled 2020.

Zephyr v. Compass et al. Retained to analyze damages arising from an alleged breach of no-poach provisions of a non-disclosure agreement during due diligence. Settled 2020.

HCF Insurance Agency v. Kevin Hamm et al. Retained to address antitrust issues involving an alleged group boycott relating to the provision of workers' compensation coverage for extended care facilities. Expert witness deposition testimony. Settled 2019.

Softwood Lumber. Retained to analyze claims that policies of Canada and its province, British Columbia resulted in below market stumpage fees that impacted trade in softwood lumber with the United States. 2015 – Present.

Chen-Oster vs. Goldman Sachs. Retained to analyze class certification issues and damages related to alleged gender discrimination. 2013 – 2020.

In Re Duke/UNC Antitrust. Retained to analyze data and issues relating to common impact and damages from a no-hire agreement by Duke and University of North Carolina medical school faculty. Settled. 2016 - 2019.

L.A. Taxi Cooperative, et al. vs. Uber. Retained to address issues in an opposing expert economist's report regarding the analysis of Uber and taxi safety data. Expert report. Settled 2017.

In Re Lithium-Ion Batteries Antitrust. Retained to analyze data and issues relating to common impact and damages for a proposed class of indirect purchasers of products containing cylindrical lithium-ion batteries. Settled. 2015 - 2019.

Scott et al. vs. Chipotle Mexican Grill, Inc. Retained to analyze employee data and calculate damages related to the alleged misclassification of Chipotle Apprentices as salaried employees. Expert report and deposition testimony. 2015 – 2017.

Margie Daniel, et al. v Ford Motor Company. Conducted an analysis of Defendant's experts' statistical procedures and provided analyses regarding a class of Ford Focus owners alleging a product defect. 2013 – 2018.

First Western Capital Management v. Kenneth D. Malamed. Retained to analyze damages relating to alleged misappropriation of trade secrets. Expert report. Settled. 2016 - 2017.

Surf City Steel, Inc. et al. vs. International Longshore and Warehouse Union, et al. Retained to analyze the competitive effects of an agreement to exclude contractors employing Ironworkers Union members from port crane modification and structural maintenance projects. Expert report and deposition testimony. Case dismissed. 2014 - 2017.

Kunkel et al v. John Wiley & Sons, Inc. Retained to analyze common impact and damages for a proposed class of photograph copyright holders who allege that Wiley infringed their copyrights in books it published. Expert report and deposition testimony. Settled. 2015 - 2017.

In Re: CRT Antitrust Litigation. Analyzed economic issues relating to class certification, liability, and damages in a price-fixing case for a class of direct purchasers of cathode ray tubes against the major manufacturers. Class certified. Settled. 2011 – 2017.

In Re: TFT-LCD Antitrust Litigation. Retained to analyze economic issues relating to antitrust liability and damages for Proview Technology Inc.'s (PTI) claims against manufacturers of TFT-LCD panels. Expert report. Settled. 2014 – 2015.

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Cobb et al. vs. BSH Home Appliances. Retained to analyze manufacturers' service data relating to the incidence of mold in front-loading washers. Expert report and deposition testimony. Settled. 2014 – 2015.

Hemy vs. Perdue Farms. Retained to analyze class certification issues and damages relating to alleged product mislabeling of chicken meat products. Settled. 2014.

Apodaca vs. Whirlpool Corporation. Retained to analyze data relating to alleged defects in Maytag dishwashers. Case settled. 2014.

Symantec vs. Veeam. Retained to analyze lost profits, reasonable royalty, and irreparable harm resulting from alleged infringement of Symantec patents. Expert report. Case dismissed. 2013 – 2015.

Ottenberg, et al v. XY, LLC and Inguran, LLC. Retained to analyze antitrust issues and damages arising from the misuse of patents and intellectual for bovine sexing technology and related equipment and sorted semen straw markets. Expert report and deposition testimony. Settled 2013.

In Re: High Tech Workers Antitrust Litigation. Analyzed economic issues relating to class certification and damages for a class of employees of seven major technology companies (Apple, Adobe, Google, Intel, Intuit, Lucasfilm, and Pixar) alleging a series of agreements to limit competition for workers. Settled following class certification. 2012 – 2015.

In Re: TFT-LCD Antitrust Litigation. Analyzed economic issues relating to class certification, liability, and damages for a class of direct purchasers of TFT-LCD panels against the major manufacturers of TFT-LCD panels. Class was certified and all defendants except Toshiba settled prior to trial. Toshiba was found liable, and damages were awarded to Plaintiffs. Toshiba settled following trial. 2008 – 2012.

Pecover v. Electronic Arts. Analyzed damages arising from the monopolization of football video games for a nationwide class of consumers. 2011 – 2012.

Realtime Data v. Packeteer, et al. Retained by defendant Expand Networks as economic expert to provide analysis of markets for wide-area network acceleration products and calculate damages from alleged patent infringement. Expert reports and deposition testimony. 2008 – 2010.

In Re: Korean Airlines Co., LTD. Antitrust Litigation. Analyzed economic issues, including market definition and common impact, relating to the certification of a class of direct purchasers of travel between the U.S. and Korea against the major Korean Airlines. 2008 – 2010.

California State Foster Parent Assoc., et al. v. John A. Wagner, Director of the California Department of Social Services, in his official capacity, et al. Retained to analyze the economic and State budget impact of a change in foster care reimbursement policies. Expert report. 2008 – 2009.

High Point Sarl v. Sprint Nextel Corp., et al. Analyzed cellular communications markets and reasonable royalty rate in a patent case involving digital cellular communications technology. 2008 – 2009.

Montana Food Distributors Assoc. v. International Outsourcing Services et al. Conducted preliminary damages analysis in a case involving allegations of anticompetitive behavior and fraud by coupon processors. 2008 – 2009.

DealerTrack v. RouteOne, et al. Analyzed lost profits and reasonable royalty damages, and the commercial success of patented features in a case involving credit application aggregation systems used for automotive sales. 2007 – 2009.

Silvaco v. Cypress Semiconductor. Analyzed lost profits and unjust enrichment in a theft of trade secrets case involving providers and customers for software for the design of chips used in devices. Expert declarations. 2007 – 2009.

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Amado v. Microsoft. Analyzed post-trial royalty rate in a patent case involving office productivity software technology. Expert declaration. 2008.

Amex v. MasterCard, Visa, et al. Analyzed damages issues in a monopolization case involving the major providers of credit and charge cards. 2007 – 2008.

M.I., LLC v. Halliburton Energy Services, Inc. Analyzed relevant market and damages issues in an attempted monopolization case involving the alleged misuse of a patent on deepwater oil drilling fluid technology. 2007 – 2008.

In re: Kdur Antitrust Litigation. Analyzed relevant market and impact issues in a monopolization case involving branded and generic drugs. 2006 – 2007.

In re: Tricor Direct Purchaser Antitrust Litigation. Analyzed relevant market and impact issues in a monopolization case involving branded and generic drugs. 2006 – 2007.

In re: Nifedipine Antitrust Litigation. Analyzed relevant market and impact issues in a monopolization case involving branded and generic drugs. 2006 – 2007.

Columbus Drywall, et al. v. Masco Corporation. Analyzed antitrust issues and assisted in drafting liability report in a price fixing conspiracy case alleged to involve a major insulation buyer and manufacturers. Analyzed issues relating to buyer power. 2006 – 2008.

Synopsys v. Magma. Analyzed lost profits, reasonable royalties, and unjust enrichment in a patent infringement trade secret case relating to software for the design of computer chips. 2005 – 2007.

The Regents of the University of California v. Monsanto. Analyzed reasonable royalties and license structure in a patent infringement case relating to bovine growth hormone. 2005 - 2006.

Pixion v. PlaceWare. Analyzed reasonable royalties and unjust enrichment in a trade secret and patent infringement case relating to web conferencing technology. 2004 – 2005.

Novell, Inc. Retained by Novell to analyze damages for mediation with Microsoft. Microsoft was alleged to have harmed Novell through alleged anticompetitive conduct in the workgroup operating system market. 2003 – 2004.

Affymetrix v. Agilent. Analyzed damages in a breach-of-contract arbitration. 2004.

France Telecom v. Novell. Analyzed reasonable royalties in a copyright infringement case. 2003 – 2004.

University of California, San Francisco. Analyzed the value of bovine growth hormone technology in the milk market to assist a patentee in a potential license negotiation. 2004.

DOS Class v. Microsoft. Assisted plaintiffs' expert in the analysis of defendant's damages models. 2003.

CATC v. Catalyst. Analyzed lost profits and reasonable royalties in a trade dress and copyright infringement case. 2002 – 2003.

IFPC Shareholders v. AT&T et al. Analyzed the option value of a lost business opportunity due to a breach of contract. 2002.

Martha Chapman v. El Paso Energy Corporation. Analyzed economic evidence regarding the nature and extent of control of El Paso Natural Gas by its parent, El Paso Energy Corporation. 2001.

In re: Flat Glass Antitrust. Analyzed liability and damages issues in a price-fixing case, including industry analysis, entry barriers, concentration, firms' conduct, and facilitating industry practices. 2000 – 2005.

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In re: Methionine Antitrust Litigation. Analyzed class certification issues for a price-fixing case, including industry analysis, market structure, and the impact of the alleged conspiracy on pricing. 2000 – 2001.

Exhibit 2
List of Additional Materials Relied Upon

Legal Documents

In Re: Cathode Ray Tube (CRT) Antitrust Litigation, Order Granting Motion for Class Certification
 Supplemental Declaration of Derek Smith re: Notice of Direct Purchaser Class Certification
 TDA's Revised Answers to Indirect-Purchaser Plaintiff's First Set of Interrogatories to Defendants

Date
08/01/22
03/17/23
09/29/14

Correspondence

Letter from Charles Malaise to Matthew D. Kent re Philips's responses to data questions
 Letter from Michael W. Scarborough to R. Alexander Saveri and Lauren C. Russell
 Letter from Paul H. McVoy to Rick Saveri re Tatung's data production
 Mitsubishi (MEVSA)'s Third Supplemental Response to DPP Crago's First set of Interrogatories
 Response to Questions Regarding Philips Data
 Response of Irico Group Corporation and Irico Display Devices Co., Ltd. To Plaintiffs' Information Requests
 Werbel Letter re Invoice Summary
 Werbel Letter to Rushing Capurro re Sample Irico Invoices
 Werbel Letter to Saveri Capurro re 3rd Batch Additional Irico Sales Summary Sample Records
 Werbel Letter to Saveri Capurro re Additional Irico Sales Summary Sample Records
 Werbel Letter to Saveri Capurro re Irico Sales Summary Questions

Date
11/01/13
03/08/12
10/06/11
02/18/16
10/22/13
01/15/09
08/06/21
09/14/21
04/24/23
04/14/23
05/11/23

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Expert Report of Henry Gao

Date
05/26/23

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Documents

CHU00031101E

CHU00624682

Defendants' Opposition, Exhibit F

HDP-CRT00019322

IRI-CRT-00031180

IRI-CRT-00031182

IRI-CRT-00031184

IRI-CRT-00031185

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IRI-CRT-00031187
IRI-CRT-00031188
IRI-CRT-00031191
IRI-CRT-00031192
IRI-CRT-00031196
IRI-CRT-00031200
IRI-CRT-00031204
IRI-CRT-00031208
IRI-CRT-00031209
IRI-CRT-00031213
IRI-CRT-00031214
IRI-CRT-00031457-468
IRI-CRT-00031944E
MTPD-0083663
PHLP-CRT-001370

Data

2023-04-05 Irico Products and Model Numbers by Entity - For Translation - Updated Translations
Iroco Customers - Chinese characters
Iroco Sales Summary (CONFIDENTIAL 2022-06-03)
Iroco Sales Summary (CONFIDENTIAL 2022-06-03) - Corrected Extract
U.S. Census Annual Survey of Manufacturers, 1996, 2001, 2005
U.S. ITC (<https://dataweb.usitc.gov/>)

Iroco Sample Invoices

CNEIECC 1TP299
CNEIECC 2TJ004
CNEIECC 2TJ148
CNEIECC 2TS404 (107)
CNEIECC 2TS404 (70)
CNEIECC 3TJ1248
CNEIECC 3TS015
CNEIECC 5T167H
CNEIECC 5T329Y
CNEIECC 6TW280
CNEIECC 7TD107
CNEIECC 7TJ001
CNEIECC 7TW239
CNEIECC 8TW193
CNEIECC 8TX087
CNEIECC 9TP083
CNEIECC 9TW222
CNEIECC OTJ351
CNEIECC OTX431
Iroco Display 00002916
Iroco Display 00009102
Iroco Display 00010035
Iroco Display 00027554
Iroco Display 00037531
Iroco Display 00047861
Iroco Display 00050823
Iroco Display 00050889
Iroco Display 00119243

Irico Display 00126816
Irico Display 0014141
Irico Display 0023161
Irico Display 00261551
Irico Display 00310409
Irico Display 00310434
Irico Display 0049486
Irico Display 00559419
Irico Display 00618846
Irico Display 01352379
Irico Display 02562085
Irico Display 1977958
Irico Display 5XOS1224
Irico Display 6RCD625
Irico Display 6TC1105 (39)
Irico Display 6TC1105 (40)
Irico Display 6TC1675
Irico Display 7BCD184
Irico Display 7FCD1561
Irico Display 7RCD1392-2-3 (121)
Irico Display 7RCD1392-2-3 (126)
Irico Display 7TOS1508 (160)
Irico Display 7TOS1508 (162)
Irico Display 7TOS1508 (163)
Irico Electronics 00016698
Irico Electronics 00250303
Irico Electronics 00901447
Irico Electronics 01253425
Irico Electronics 5CH032
Irico Electronics 5LOS740-4A
Irico Electronics 6ZOS495-1
Irico Electronics 7TC0558-14
Irico Group 00001410
Irico Group 00001874
Irico Group 00004913
Irico Group 00007179
Irico Group 00008832, 00008834
Irico Group 00010320
Irico Group 00014132
Irico Group 00014916, 00014959
Irico Group 00015132
Irico Group 00015370
Irico Group 00027817
Irico Group 00027912
Irico Group 00028877
Irico Group 0003148
Irico Group 00036858
Irico Group 00038875
Irico Group 00044396
Irico Group 00044609
Irico Group 00044768
Irico Group 00044834
Irico Group 00049785

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Irico Group 00052331
Irico Group 00102977
Irico Group 00126257
Irico Group 00126820
Irico Group 00416998
Irico Group 0049697
Irico Group 00797439
Irico Group 0185797
Irico Group 0189617
Irico Group 0190822
Irico Group 02143266
Irico Group 02578927
Irico Group 0416952
Xi'an Cairui 5BCR259
Xi'an Cairui 5BCR469
Xi'an Cairui 5BCR875
Xi'an Cairui 5RCR236
Xi'an Cairui 5RCR387
Xi'an Cairui 5RCR467-1
Xi'an Cairui 5RCR581-1
Xi'an Cairui 5RCR761 (53)
Xi'an Cairui 5RCR761 (56)
Xi'an Cairui 5RCR761 (99)
Xi'an Cairui 7BCR1007-1
Xi'an Cairui 7RCR1181-3
Xi'an Cairui 7RCR415C